

# Chemical Age

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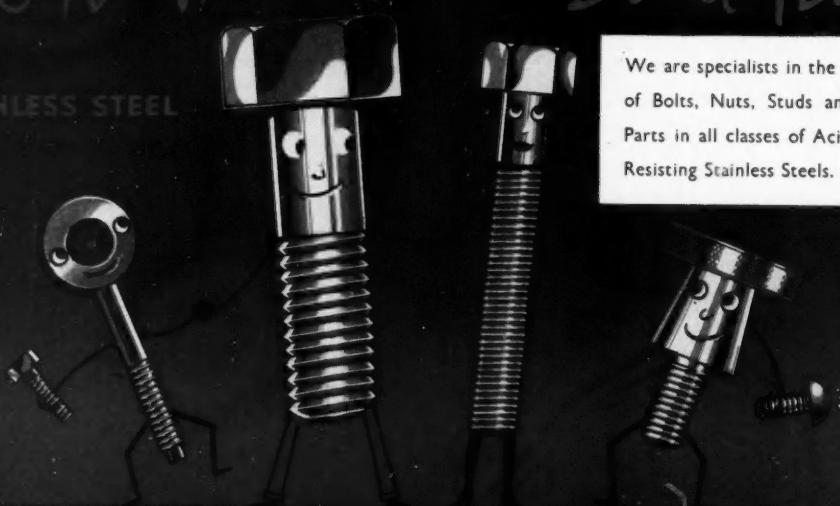
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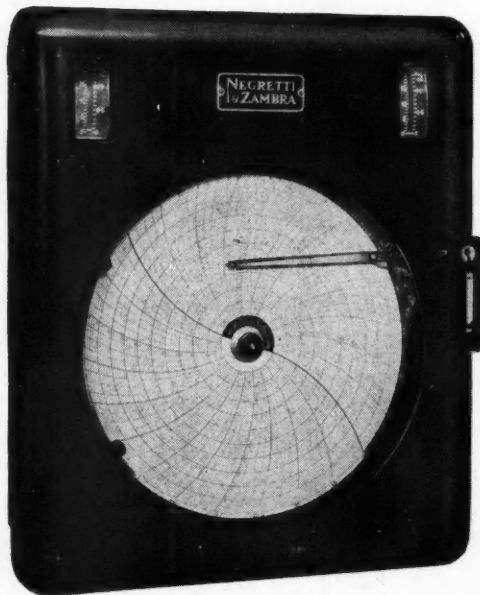


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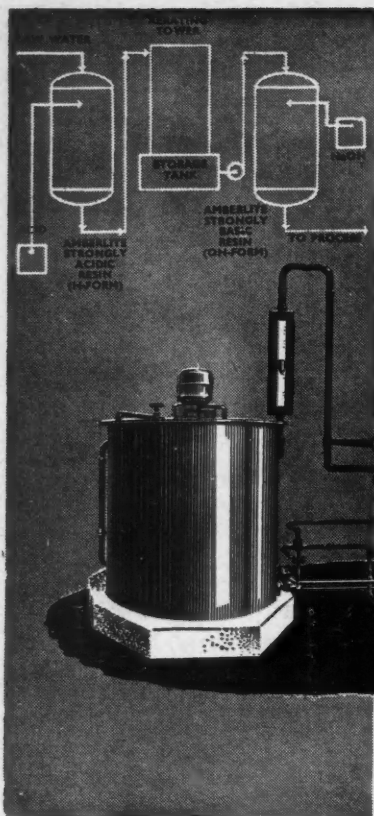
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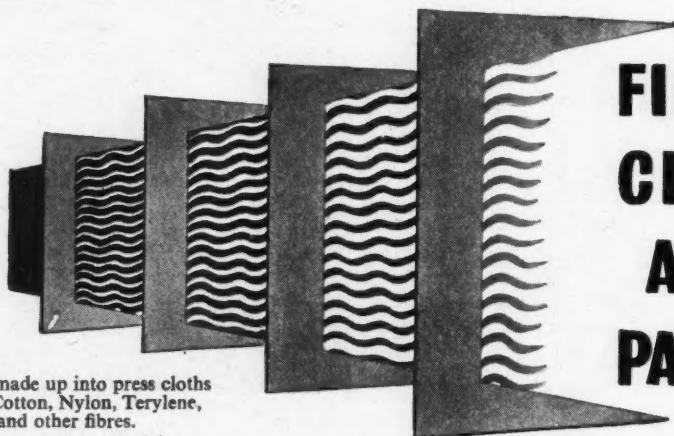
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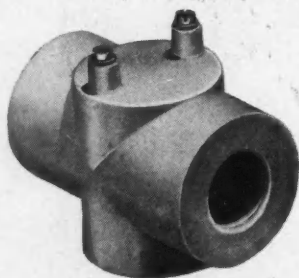
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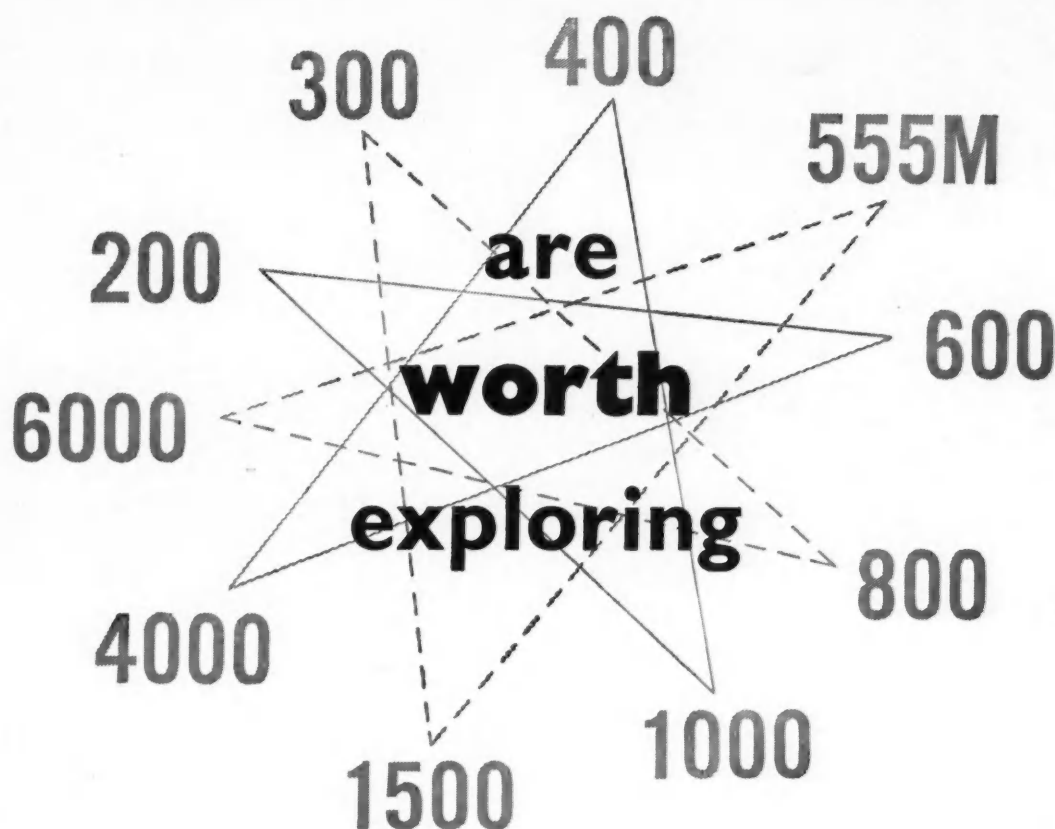
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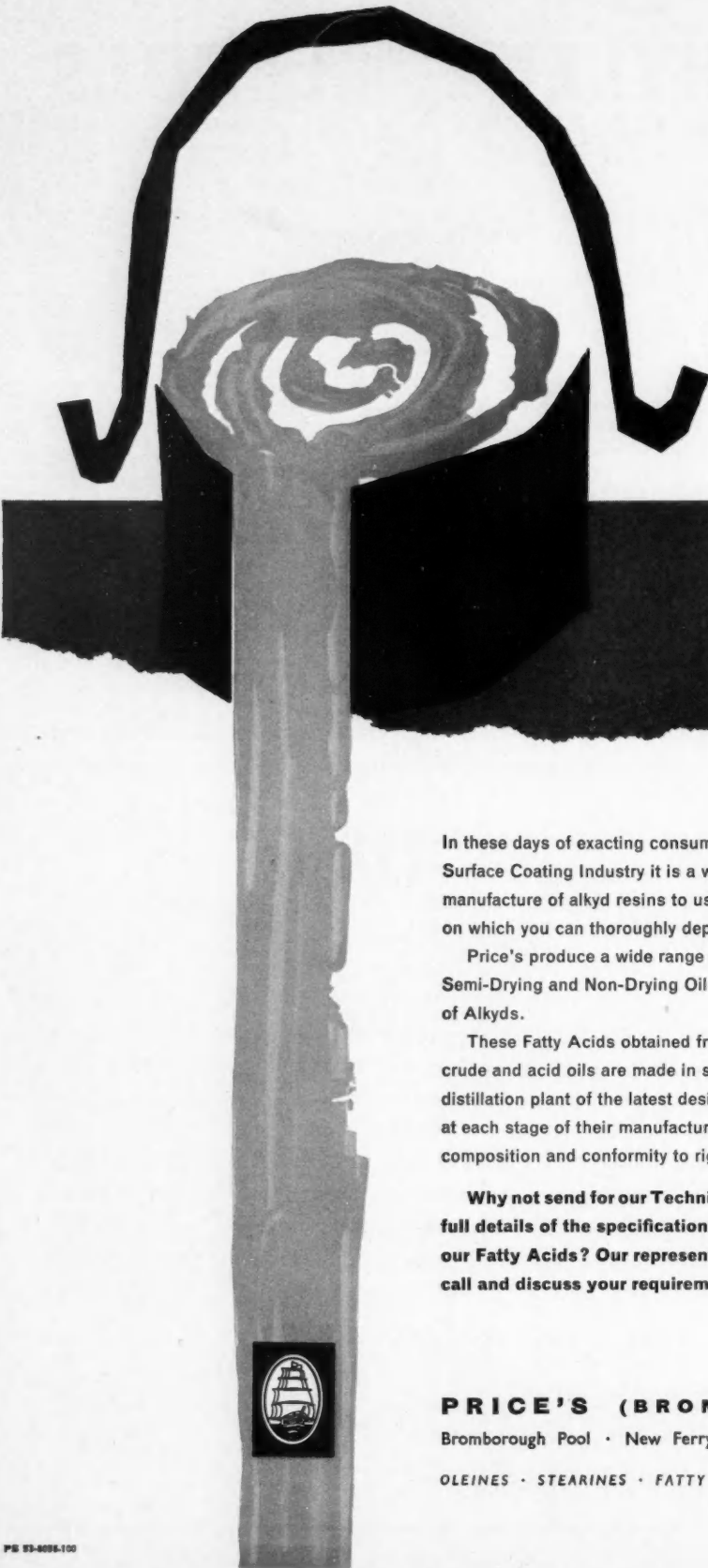


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# CHEMICAL AGE

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## OLYMPIA EXHIBITION

**B**Y the time this issue of CHEMICAL AGE reaches readers, the first-ever Chemical and Petroleum Engineering Exhibition will be almost over. There is no doubt that on the grounds of quality of display and the impressive number of new developments shown the exhibition has been one of the most successful industrial shows ever held in this country. Despite that, attendance has been most disappointing.

On its merits, the exhibition should have been crowded every day. Most exhibitors have their pet theories why this was not so. Lack of publicity was one reason given by many; so far as the technical press is concerned this is not true. The journals have given the exhibition much advance publicity, CHEMICAL AGE and its 20-page preview of new developments leading the field. It may well be that far more free invitations should have been issued, with exhibitors having enough tickets to send to all their customers, at home and overseas.

Some exhibitors felt that the show was held too near to the Achema in Frankfurt. Certainly this fact might have deterred potential overseas visitors. It should not have put off UK visitors.

The poor attendance was probably more fundamental. Trade exhibitions in the UK are not nearly so popular as they are on the Continent. Even before the British Industries Fair flopped, a marked apathy towards industrial exhibitions was noticeable. This is doubtless due to the fact that most companies buying plant, equipment or processes feel they are familiar with sources of supply. They make their purchases when the need arises and do not save them for an exhibition.

Most of the exhibitors did not expect to book orders; but clearly felt that they should have received more enquiries. It was freely admitted, however, that such enquiries as had been received up to Wednesday were mostly of a genuine nature, even if few in volume. Attendance picked up slightly from Tuesday onwards, but actual figures are not available.

It cannot be said that the present economic climate had more than a slight influence on attendance. The experience of the chemical industry does not match the somewhat gloomy report of the Federation of British Industries into industrial trends, published this week. Sales of chemicals are in general being fairly well maintained. In fact, the chemical industry is surprised that it has not been harder hit. Apart from turnover declines in a few isolated sectors of the industry, there has been little more than a levelling off in the increase experienced for the past few years.

This is no doubt due to the high level of investment in recent years, particularly in petrochemicals. It is true that fewer new plants have been announced in the past few months, but work in hand will continue until 1959 or 1960 and even later in the case of the largest projects. Competition is obviously keener and in this respect, Sir Walter Worboys sounded a warning note in his recent remarks that ICI were now operating at between 80 and 90 per cent of capacity. This, however, is probably due to steadily increasing capacity, rather than to any falling off in demand.

With the cuts in the bank rate, the increased allowances for plant, machinery and industrial buildings and the general economic climate in the chemical industry, much greater interest should have been shown at Olympia. This experience

should provide a few lessons for the future. It might be as well to forgo the high quality of display at any future exhibition of this nature. Standardised stand units may not be so attractive, but they are undoubtedly more business-like, and that surely is the main reason for exhibiting. This would lower the cost to the exhibitor and would do away with the totally enclosed type of stand that does not

encourage visitors to enter.

Greater publicity by way of invitations to individuals would help. So would publicity in the national press. It might also help not to hold the exhibition in the same year as Achema and to consider adding to interest by making the exhibition international in flavour. Such a move might attract more overseas visitors.

## NEWS ON RUBBERS

**A** MAN-MADE rubber which may be a more elastic material than ordinary rubber is reported by the B. F. Goodrich Research Centre. Known as deuterio rubber or D-SN (deuterium-synthetic natural), the product is all-cis, all-1,4 polyisoprene in which all the hydrogens have been replaced by heavy hydrogen.

Although only experimental at present (some 250 grammes have been produced), it is believed that it may prove of value in basic studies on natural rubber's unique properties. Also it may help in explaining why rubber gives off and absorbs heat during deformation, and the impaired absorption and crystallisation of rubber. An explanation for the remarkable elasticity of this synthetic that has been suggested by the Goodrich research director is that molecules containing heavy hydrogen atoms apparently attract each other less strongly than those containing hydrogen. Due to its content of heavy hydrogen, the specific gravity of deuterio rubber is 1.007 as against the usual 0.9.

The new rubber can be vulcanised in much the same way as natural rubber or the usual synthetic 'natural' rubber. It does not require carbon black reinforcement to develop high tensile strength. Present production cost of the new rubber is stated to be at least 100 times as much as that of ordinary rubber.

Details released of the synthesis of this rubber show that 99.5 per cent heavy water is used to convert acetone to perdeuterio acetone. This is then treated with the potassium salt of perdeuterio acetylene to form the potassium salt of perdeuterio methyl butynol. Hydrolysis of this with heavy water gives perdeuterio methyl butynol (PMB). In the presence of a palladium catalyst, deuterium gas converts PMB to perdeuterio methyl butenol. Using an aluminium oxide catalyst, heavy water is split off to give perdeuterio isoprene. This latter is polymerised with a Ziegler catalyst (aluminium triisobutyl and titanium tetrachloride) to produce perdeuterio polyisoprene.

From the US Rubber Research Centre (*Chem. and Engng. News* 1958, 36, No. 23, 36) comes news of a butyl rubber with exceptional thermal stability. This has been produced

by replacing sulphur as the conventional vulcanising agent with phenol-formaldehyde derivatives such as 2,6-dimethylol-4-hydrocarbylphenol or its condensation polymers.

The idea of using these compounds is not new but the previous work was dropped before it reached a commercially useful stage. Certainly, these compounds are of no advantage with natural rubber. In butyl rubber, however, reversion or de-vulcanisation has proved to be a problem. The phenolic condensation polymers appear to provide the long-sought stable cross-link.

Used alone, the phenolic vulcanising agent acts slowly (some four hours at 322°F in an inert atmosphere to obtain 80 per cent of a full cure compared with just over an hour using a sulphur system). Research worker, P. Viohl and colleagues of US Rubber Research Centre, found that two parts of stannous chloride would cut curing time by a factor of four. It was also found that this metallic halide not only increases the rate of cure, but it also makes possible an increase in the over-all degree of cure that can be obtained.

It is claimed that the rubbers produced are outstanding. Whereas a conventional butyl formula with sulphur loses 55 per cent of its optimum stress at 200 per cent elongation after heating at 322°F for four hours in an inert atmosphere, a corresponding butyl rubber vulcanised with a phenolic condensation polymer has shown no loss of strength even after heating for 16 hours at the same temperature. It even stands up well over a prolonged 20-day test. Improved resistance to air ageing by 100°F over the range of 300°F to 400°F means, too, further applications for this butyl rubber.

Other tests have been carried out to learn whether high temperature butyl rubber has other properties associated with rubbers made with sulphur. One such property that has been investigated is its ability to form a strong bond with metals. Adhesion tests have indicated that very adequate bonds can be obtained. Thus, a butyl rubber after 144 hours at 320°F retained its adhesion for 4 hours at 450°F.

It is understood that US Rubber have had phenolic vulcanised butyl rubbers in use since 1953 within their organisation. Last year they became commercially available.

## NEW ETHYLENE OXIDE PROCESS

**T**HREE new plants, two in the US and one in Great Britain, will shortly come on stream using the Shell Development process of direct oxidation by oxygen instead of air for producing ethylene oxide from ethylene.

The three plants, all erected by the Lummus Co., are those of Wyandotte Chemical (due to be on stream now), Calcasieu Chemical (some time this month) and Shell Chemical with a plant ready at Partington but awaiting completion by this summer for facilities for ethylene supply. Each of these plants has a production capacity of about 60 million lb. a year.

This Shell process competes directly with other air oxidation processes, such as that of Scientific Design Co. The earlier Shell process used air but later work indicated that

use of oxygen was preferable in large plants such as those of between 10 and 20 million lb. a year.

The expense of installing and operating oxygen plants against the other direct oxidation processes using air is justified, state Shell Development.

Elimination of nitrogen from the process is claimed to result in an over-all reduction in fixed investment and operating costs. Process equipment is smaller and power costs are lower as less gas has to be handled in the system. The absence of nitrogen, report Shell Development, also permits recycling of unconverted ethylene thus enabling optimum economic yield to be obtained. It is understood that a silver catalyst which differs from others in choice of carrier and method of deposition is used.



# CA REPORT OF CHEMICAL ENGINEERING EXHIBITION AT OLYMPIA

## High Quality Displays and New Developments Fail to Attract Large Attendances

**T**HE Chemical and Petroleum Engineering exhibition which closes at Olympia on Saturday this week provided British chemical plant manufacturers with a unique opportunity of displaying their products. The standard of display was extremely high, with many spectacular exhibits on show. Most exhibitors were introducing new plant, equipment or processes and prototypes of many items of equipment were rushed through for the exhibition.

Although many exhibitors were disappointed with attendance numbers, there was universal agreement that the enquiries made on the various stands were of a genuine nature. There seemed to be few visitors among the stands on the days the exhibition was open last week and on Monday this week. However, on Tuesday and Wednesday this week there was a definite increase. Attendance figures are not available.

More than 600 persons registered for the symposium on 'The organisation of chemical engineering projects', which opened on Tuesday this week at Olympia. It was held jointly by the Institution of Chemical Engineers and the Institute of Petroleum. (See page 1203).

As is usual at exhibitions of this nature, a number of visitors, including some from Czechoslovakia and Japan, seemed particularly interested in obtaining drawings of exhibits and in copying captions in detail or photographing exhibits.

A party of Soviet petroleum experts taken round Olympia by Mr. E. Lawson Lomax and Mr. L. Nakhimoff, a naturalised Briton, placed tenders, mostly for petroleum equipment, to the value of more than £1 million. One tender alone was for £600,000. Among the stands visited by the party was that of the Kellogg International Corporation, where the model of an ethylene plant for Petrochemicals Ltd. aroused keen interest. Official Czech and Chinese parties also visited the exhibition.

Further to our exclusive 20-page preview of the exhibition published in CHEMICAL AGE, 14 June, the following is a survey of other new developments, many of which were specially prepared at the last minute for inclusion at the exhibition.

### Podmore Boulton Vibratory Mill

Details regarding the new vibratory mill which gives finer grinding and micronising with less contamination, developed by William Boulton Ltd., of Burslem, and W. Podmore and Sons Ltd., of Shelton, Stoke-on-Trent, are now available (see CHEMICAL AGE, 14 June, p. 1099). This is stated to be the first time a mill has been developed which effects fine grinding with close control of high frequency small amplitude vibration. The machine has been on trial production for two years.

The new mill is the result of 16 years of research. Small high frequency mills equipped with electro-magnetic vibrators developed by Podmores were able to grind materials having a hardness of 9 on the

mohs scale easily and rapidly to give a specific surface of 35,000 cm.<sup>2</sup>/g., power input being less than one-twentieth that of a ball mill of equal capacity.

At the time of scaling up these laboratory size units, Wm. Boulton had introduced a vibratory screen in sizes up to 44 in. diameter using controlled gyratory motion in horizontal planes in which radial and tangential could be altered and adjusted to any load distribution pattern desired.

The Podmore-Boulton mill works on the principle of applying small forces at high frequency in conjunction with a special grinding media. Working volume is at least 95 per cent of the grinding chamber and the space available for grinding is the volume of the interstices between the media. In a mill in 12 months of continuous use it has not been found necessary to add to the original quantity of media (usually Alanite). The mill will work equally well, it is claimed, with steel balls if the material is not susceptible to metal contamination.

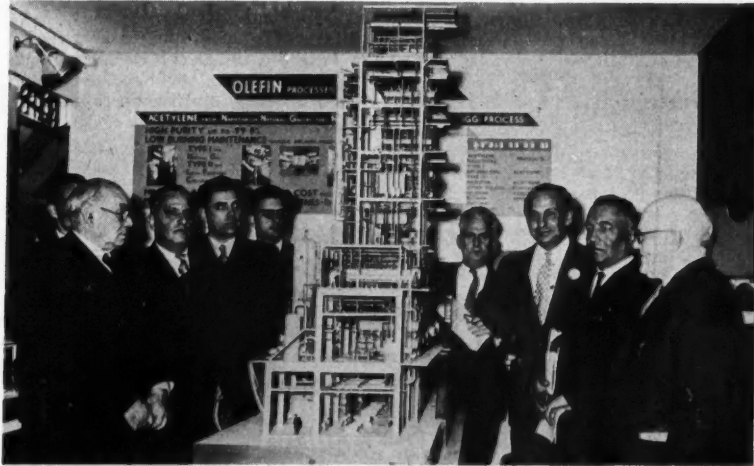
A valve is fitted at the bottom of the vessel for running off the ground product. The vibro energy mill can be run while discharging, thus facilitating the handling of thixotropic materials. It is also practicable, the manufacturers say, to draw off test samples without stopping the machine.

Other points noted for the vibro energy mill are: direct drive by built-in electric motor with simple direct starter; low starting torque, no gearing or clutch required; grinding chamber and charge supported on high tensile steel springs; smooth and quiet in operation; easy and accurate control of particle size (100's BSS to sub-micron size); negligible contamination; and complete after sales service.

A mill, 2 ft. 6 in. by 2 ft. 6 in., having a total capacity of 80 gall., is now available ex-stock, price approximately £350 to £400. Large mills, 5 ft. by 5 ft., are expected to be available in six to eight weeks time at an estimated cost of about £1,250.

### 'Push-fit' Model-making Technique

Although the number of visitors to Olympia this week and last has caused general disappointment, a number of stands were busier than most. Among these was that of the Kellogg International Corporation, Cavendish Square, London W1. The only item displayed was the US parent company's model-making technique, which was being shown in this country for the first time. The new technique simplifies model construction for no special



The USSR petroleum experts who toured the exhibition under the auspices of Mr. E. Lawson Lomax, right, and, first left, L. Nakhimoff. They are seen here inspecting a model of an ethylene plant on the stand of Kellogg International Corporation. From Kellogg, fourth and third from right respectively, are, W. P. Given, head of process department, and Dr. F. Sager, project manager

tools or skills are needed. A number of standard plastics scale model components make up the kit and are fitted together by a 'push-fit' method. Kellogg design staff can work directly on the model, making any alterations themselves.

The cost of a 'complete design model,' which is continued throughout the design period and ends up as an exact scale facsimile of the contemplated plant, will be about .4 per cent of the erected cost of the plant. For a model that is carried through the planning phase only, the cost will be halved.

This new Kellogg technique was demonstrated by two large models of the ethylene plant to be constructed for Petrochemicals Ltd.

### FluoSolids Process

First users of the *Dorr-Oliver* FluoSolids process (see *CHEMICAL AGE*, 14 June, p. 1102) in this country are J. G. Stein Ltd., of Scotland, who are using it for a continuous drying, calcining and cooling process treating fireclay. A multi-compartment calciner is used, with the calcining compartment situated mid-way. Hot gases from this compartment are used to pre-heat the incoming feed and solids leaving the calcining section give up most of their heat to the combustion/fluidising air on its way up. Thermal efficiencies of 85 per cent are claimed, and depending on proportion of surface and bound water in the feed and the required calcining temperature 10 to 15 gall. of oil per ton of product is consumed. Reduced fuel costs in the order of the ratio of 5:8:7 when the FluoSolids system is compared with shaft and rotary kilns is claimed. Bed temperatures are controlled by instrumentation.

By comparison with rotary kilns, the floor space occupied by a FluoSolid unit is in the region of one-third or less, but 40-60 ft. head room is required. Even with 3 or 5 beds in a state of turbulence little vibration is said to be evident. In the Scottish plant a single shift operator is all that is required. Temperature can be controlled by  $\pm 10^\circ\text{F}$  and a high quality of product is obtainable since 99.8 per cent carbon dioxide removal is possible. Reactivity of the product can be altered at will.

Another plant is expected to be in operation at Stein's in August.

### Vacuumation System

The BVC Vacuumation system was demonstrated by the *British Vacuum Cleaner and Engineering Co. Ltd.*, Leatherhead. This provides floor to roof cleaning, sump

emptying, clearance of stacks, boiler cleaning, including the shifting of red hot waste from boilers, extraction of solid or liquid particles from the air. In addition, the process can in many cases be used for conveying liquids and solids (in powder or granular form). For certain applications, Vacuumation is completely automatic.

### Voting in CA 'Polythene or Polyethylene' Poll



Mr. E. J. Smeaton (*English Electric Co.*) records his vote in the polythene-polyethylene ballot on the 'Chemical Age' stand. With him is Mr. F. D. Lain (also of *English Electric*). Two prizes of £10 each are offered for the best reasons given for choosing either word (see CA, 21 June, p. 1153)

### Oxygen Plants

*British Oxygen Ltd.* featured photographically the new mobile oxygen generating plant (see p. 1211). Small mobile oxygen generating units were developed by British Oxygen during the war years. This latest unit only requires removal of the packing case and connection to the electricity supply to start operating. One such unit has already been sold to Goa.

The oxygen plants under construction at Partington and Shell Haven are expected to be in operation about the end of July and about the end of August to beginning of September respectively.

It is learned also that construction at the 100-ton per day oxygen plant at Port Kembla, Australia, is well under way. The

plant will supply the nearby steel plant of Australian Iron and Steel Ltd.

### New Valethene Drum



New Valethene 45-gall. lined drum introduced by *Metal Containers Ltd.* and described in *Chemical Age*, 14 June, p. 1109

### Stationary Compressor

Main feature of the new equipment section on the stand of *Consolidated Pneumatic Tool Co. Ltd.*, London SW6, has been a machine representing a new range of stationary compressor known as class FE. Of horizontal, balance-opposed design this is suitable for building up for a wide range of service. The crankcase and running gear can be fitted with different sizes and numbers of cylinders to give outputs of up to 5,000 c.f.m. FAD or pressures up to 3,000 p.s.i. The two cylinder arrangement is used for h.p. up to 350, and four cylinders for h.p. between 350 and 700.

Also shown for the first time was a complete range of Lagonda tube cleaning equipment now being made under licence by Consolidated Pneumatic. This embraces a series of air-powered tube cleaning motors that cover straight and curved tubes ranging from  $\frac{1}{4}$  in. to over 6 in. diameter. All types of cutter heads were on show and indicated how any form of tube cleaning service can be catered for.

### Glass-enamelled Reactors

The best features of both enamelled cast-iron and glass-lined mild steel are continued in the new standard enamelled reactor by *T. and C. Clark and Co. Ltd.*, Shakespeare Foundry, Wolverhampton. The reactor has a bolted-on mild steel steam jacket and the provision of four large openings in the cast-iron cover. The former feature gives the engineer the advantage of being able to remove the inner pan while being able to replace inner pans quickly. Re-enamelling, it is stated, can be carried out without damage to the jacket.

All contact surfaces are lined with Clark's hard glass acid resisting enamel. Full use has been made also of polytetrafluoroethylene both for joints and in the packing of the water-cooled stuffing box to reduce further the risk of contamination.

The new Clark reactor can be obtained



Examining a demonstration model of their company's FluoSolids technique are l. to r. Mr. W. Stephens, Mr. K. C. Salter and Mr. D. Dennis

in capacities ranging from 200-300 gall. to 750-820 gall. Standard internal pressure is 60 p.s.i., or full vacuum the standard jacket pressure is 100 p.s.i., or 85 p.s.i. with full vacuum internally.

This company announce also that they have a new enamel, at present known as TS4, having improved acid resistant properties and useful alkaline media. This enamel is intended mainly for application to mild steel, but can also be used on cast iron. This enamel has not yet appeared on the market but the results of production trials are reported as being satisfactory. It is expected to be generally available shortly. T. and C. Clark say they will be glad to supply test samples for customers who wish to carry out their own tests on the enamel, and also to receive enquiries from any firms who may wish to try out the enamel on items intended for plant use.

A glass enamel lined flush bottom outlet valve, simple in construction, which has proved satisfactory in service, was of interest. A seating of Fluon is employed against which a glass enamel coated valve head impinges to make the seal. The valve is suggested for use with all types of reactors employed in the chemical industry.

A downward closing type is available when a larger bore outlet on the pan is necessary to clear the valve head. When the upward closing type is required the mild steel glass enamelled coated seating is reversed and a shorter valve stem employed.

### Molecular Distillation Stills

Prototypes of two new developments were specially rushed through in time for the exhibition by *Edwards High Vacuum Ltd.*, Crawley. The first was the versatile model GD1 gas detector unit, a highly sensitive detector for outward leakage on pressure systems, or vacuum systems slightly pressurised with detector gas. The instrument detects leaks as small as 1/50 g. of hydrogen per year and is sensitive to all gases and vapours with thermal conductivities differing from that of the ambient air.

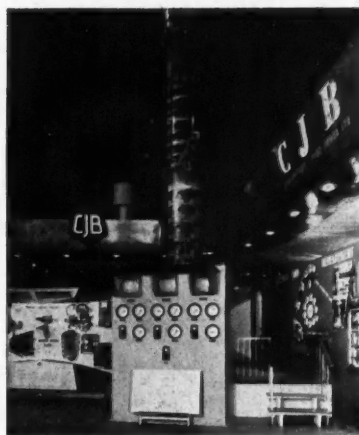
Central spot on the stand was reserved for a prototype of a 2 in. molecular vacuum still. Two larger models are at the drawing-board stage. An uncompleted version of this instrument was shown at *Achema*. Molecular distillation under high pressure is a rapidly developing industrial technique in the purification or separation of heat

sensitive low vapour pressure materials of high molecular weight—such as vitamins, essential oils, fatty acids and some petroleum derivatives. The 2 in. model has been designed for research for pilot plant work, or for the production of expensive materials at capacities up to 250 gm/hr.

### Production Unit

Production units of the molecular still are available from *George Scott and Son (London) Ltd.*, Leven, Fife. On the stand of the Balfour Group, they showed a 12 in. pilot still of US manufacture and used in their development laboratories for research and materials testing. The range of Scott-Smith molecular stills has capacities of 24, 36, 48 and 60 in. body diameter. The normal range of application of these stills is among materials with molecular weights above 250.

### 35-ft. Column



This 35 ft. by 2 ft. 6 in. diameter working model of a distillation/absorption column was shown by Constructors John Brown. Observation of the gas liquid through the plates was achieved by closed circuit TV

### Very Pure Water at Low Cost

Further details of the Griffin-Raleigh deioniser (described briefly in *CHEMICAL AGE*, 14 June, p. 1105) are available from *Griffin and George Ltd.*, Alperton, Middx. It was developed as a result of an invention in ion exchange technique, which, employing three resins instead of two, enables mixing and reclassification of the resins to be carried out in columns down to 3 in. in diameter. This is said to make it possible to regenerate small columns *in situ* and to produce extremely pure water at a cost of about 3d per 20 gal. when using London mains water as the raw influent. In areas such as Belfast or Plymouth, where the raw water contains a very small proportion of dissolved electrolytes, deionised water can be obtained for 3d per 200 gal.

A built-in amplifier and a bridge circuit incorporating a conductivity cell enables effluent quality to be monitored and the circuit is independent of mains voltage and temperature fluctuations.

The Griffin-Raleigh water deioniser is supplied ready for use in two sizes giving 16 and 64 gal. of very pure water respectively. Using mains water, flow rates of 5 and 20 gal. per hour may be employed



On Griffin and George's stand are 1. to 6. Mr. W. L. Jones (Caltex Services Ltd.) Mr. H. Black (G and G), Mr. A. H. Wellings (Caltex Services Ltd.), Mr. W. Smith and Mr. A. Carling (G and G)

with an effluent conductivity of 0.2 micromho. Using as influent either single distilled or two-bed deionised water, the effluent conductivity may approach 0.05 micromho and an inter-regeneration capacity of several thousand gallons is realised. Capacity is determined by the total cations present and not on the basis of hardness alone.

Where highly-basic/highly acidic resin

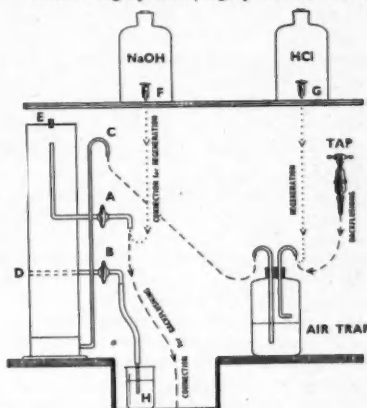


Fig. 1  
E. Rubber Stopper

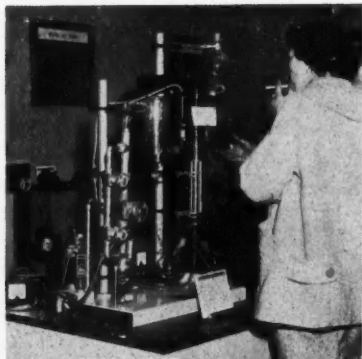
Flow diagram of the Griffin-Raleigh water deioniser: A, water stopcock; B, central distributor stopcock; C, deionised water outlet; D, central distributor; E, rubber stopper; F, alkali stopcock; G, acid stopcock; H, beaker

combinations are employed, even feebly ionised substances, such as  $\text{CO}_2$  and  $\text{SiO}_4$ , are quantitatively removed and only pure water is capable of permanent existence. Where alcohol or water/alcohol mixtures are passed through a bed of suitable mixed resins, the effluent will be free not only of inorganic ions, but also of organic ions such as pyridine, if present in the influent.

Since the resins react with all ionised substances, radioactive ions will be removed from solutions containing them.

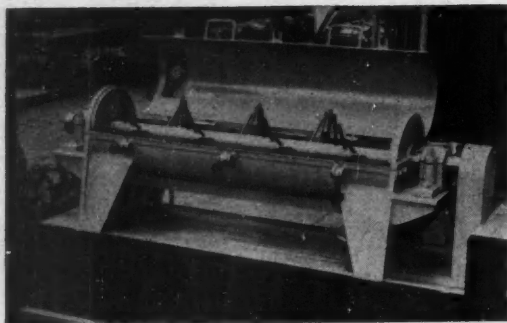
### New Granulator and Mixer

The pin granulator which was shown by *W. J. Fraser and Co. Ltd.*, Harold Wood, Essex, was designed in co-operation with *Scottish Agricultural Industries Ltd.* Intended primarily as a pre-granulator, it



Dr. A. Z. Borucka (Chemical Engineering Department, Imperial College, London) examining the molecular vacuum still





Model of the Fraser pin granulator with cover raised

consists of a longitudinal shaft fitted with two rows of pins arranged helically so that when the shaft is rotating the pins carry the material along.

The shaft rotates at high speed so that the input material and water are kept in agitation and agglomerate to form small granules which, when fed to a conventional granulator, it is claimed, yield granules of better uniformity.

Fraser are sole UK licensees for the Nauta counter-current mixer, patented by NV Nautamix of Holland, which was also on show. An inclined mixing screw rotates inside a conical container, carrying the material up the side of the container. At the same time the screw rotates round the wall of the container. This combined horizontal and vertical movement plus the converging effect as the material falls to the bottom of the cone causes quick and efficient mixing, it is claimed.

### New Drying Cabinet

Visitors to the stand of *L. A. Mitchell Ltd.*, Manchester 2, were able to see a number of new developments. The new Mitchell hot air drying cabinet is of attractive design; all controls are on the front and the actual drying cabinet is set at a higher level than the previous model. Capacity is 10 drying trays which give volumetric capacity of 3 cu. ft. and an effective tray area of 35 sq. ft. The model has been designed for the development of new products, pilot scale work, or for small special batches. Maximum operating temperatures are: steam heating, 100°C; electric heating, up to 250°C.

Also new are two models in the range of Mitchell vertical self-priming centrifugal acid pumps that require no coupling or lining up. The use of hollow spindle motors eliminates pump bearings. The range is made of armoured corundum stoneware. New models are type MV/SP, vertical self-priming, with either mechanical

seal or packed gland; type MV/FS, for use on 'flooded suction' applications with either mechanical seal or packed gland.

Another new pump on view was a heavy duty corrosion pump, type MS.15/305, thought to be the largest of its kind in the world. Designed for handling up to 1,300 g.p.m. against heads up to 120 ft. all internal parts are produced in hard corundum material for maximum resistance to corrosion by all acid and corrosive liquids (except hydrofluoric acid) and for keeping liquors free from metal contamination.

### Repairing Metal Pipes with Fibreglass

Attracting interest on the stand of *Fibreglass Ltd.*, St. Helens, was a technique of repairing corroded metal pipes and ducts with Fibreglass reinforcement fibres and epoxide resin. A corroded steel pipe repaired with materials in a Thistlebond repair kit, was displayed. Also shown was a range of centrifugal fans in Fibreglass reinforced plastics now available for extracting corrosive fumes at medium and low pressures. Another display of interest was Fibreglass in the Multi-Pak filter. This unit is for use in places where a high degree of air cleanliness is necessary. Filters can be packed with fibres of different diameters and densities to give varying degrees of efficiency.

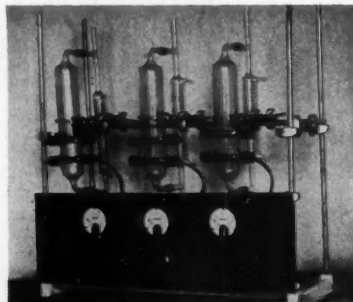
### Humglass Urea Process

*Humphreys and Glasgow Ltd.* announced at the exhibition that in conjunction with *Stamcarbon NV.*, Holland, they can now offer integrated plant for the production of urea by the Stamcarbon process.

Although several processes for the synthesis of urea from carbon dioxide and ammonia have been developed, the high pressure and severe conditions in the reactor have hitherto always caused severe corrosion difficulties. Stamcarbon, by a combination of the use of an alloy steel

and special process conditions, report that they have succeeded in reducing attack to a negligible degree. Other advantages claimed for the process are: high quality of product, e.g. Biuret content below 1.3 per cent and water below 0.3 per cent with a nitrogen content of over 46 per cent; high product yield and low energy consumption; carbon dioxide used need only have a purity of 97 per cent; the prilled product is capable of bulk storage over long periods with only superficial surface aggregation which can be easily broken. (This is stated to be due to regular prills of high mechanical strength giving no caking and requiring no coating material.)

### Measuring Influence of Thermal Load



*Mond Nickel* showed this apparatus developed to measure the influence of 'thermal load'. The specimen—a tube heated internally—heats the corrosive liquid which circulates in a thermal loop. Rate of heat transfer across the specimen/corrosive liquid interface may be widely varied. Temperature of the liquid returning to the specimen tube can be adjusted by altering temperature of the water in the condensers. A control specimen determines the corrosion rate under conditions not involving heat transfer

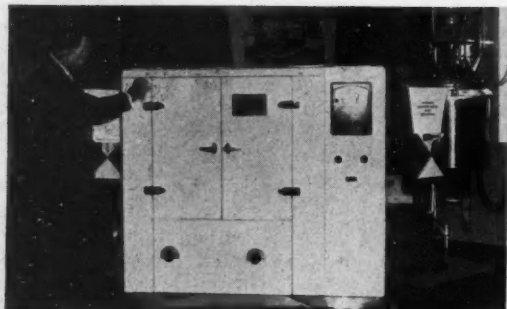
### Flake Ice-Making Plant

*J. and E. Hall Ltd.*, Dartford, Kent, in conjunction with *Frederick C. Kane Ltd.*, London, showed the Hallmark Col-Flake ice-making plant, shown to the chemical industry for the first time. The refrigerant occupies the annular space between the double walls of a vertical freezing drum, and cools the inner surface. A smooth and uniform flow of water is maintained from a water-header at the top on to the chromium-plated freezing surface where it forms a sheet of ice.

The only moving part of the flake ice-maker is the rotor arm carrying the blades which remove the ice. Just before the blades crack and dislodge the ice, the water flow stops and the ice becomes super-cooled and dry, so that the ice falls freely from the drum into the collecting bin. Water not converted into ice is aerated in the water system before it is returned to the water header and thence back to the freezing surface.

Flakes produced by the Hallmark are of irregular shape, averaging 1 in. square and  $\frac{1}{8}$  in. to  $\frac{1}{4}$  in. thick. The machine is suitable for use with Refrigerant 12 (Arton 6, Freon 12) ammonia, brine or any other convenient refrigerant. About 90 lb. of ice an hour can be produced.

The manufacturers say that as all water



Mr. L. A. Mitchell (*L. A. Mitchell Ltd.*) demonstrating his company's hot air drying cabinet



is discharged when the machine stops, no sediment can accumulate.

### Plant Model for Hot Potassium Carbonate

A feature on the large stand of the *Power-Gas Corporation*, Stockton-on-Tees, was the model-making technique pioneered by the company some four years ago. Visitors saw a model made two years ago, which had just returned from the building site on completion of the plant—a hot potassium carbonate plant for the ICI Billingham oil gasification unit. Photographs and diagrams showed the part played by models in plant design and construction, from the time that model-making experts are called in from Industrial Models Ltd., Ashton-under-Lyne, to the time when plant is constructed against the model.

On this stand interest was also shown in the 18/8 Ti mitred bend (illustrated).



Tests on 18/8 Ti mitred bend, shown on stand of Power - Gas Corporation

It was stated that a recent field contract stipulated 90° sharp radiused bends on pipework to withstand a working pressure of 3,000 p.s.i., which was impracticable by ordinary methods. Experience suggested a solution that was successfully applied after test.

Two mitred joints were externally welded by the Argon arc process and tested to destruction. They failed by bursting in the wall of the pipe at 8,820 p.s.i. (600 atm.) and 9,408 p.s.i. (640 atm.). In both cases, welds remained intact. The tremendous strain induced in the pipe before rupture is clearly shown by the permanent enlargement of the pipe diameter of 0.552 in.

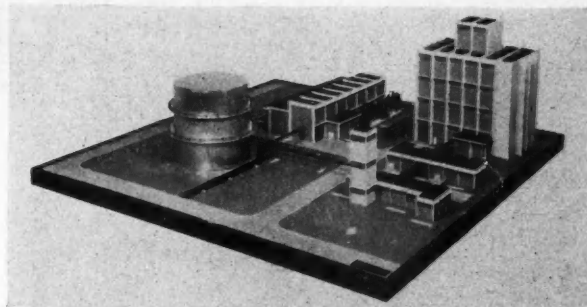
A number of new developments were introduced by the associate company, *Rose, Downs and Thompson Ltd.*, Hull. It was stated that the firm's S2 nutting and compound milling machinery, suitably adapted, might be of use for palletting in the fine chemical industry. Rosedowns have introduced to the UK, a new process for the external cladding of rolls, shafts, tubes and drums with stainless steel and corrosion-resistant materials.

Among visitors who saw their equipment was an official Chinese party. Rosedowns have a long established export connection with China.

### Heavy Water by H<sub>2</sub> Distillation

With regard to the short note on the

### Model of heavy water production plant shown by Petrocarbon Developments



process for heavy water production by distillation of hydrogen designed by *Petrocarbon Developments Ltd.*, 17 Stratton Street, London W1, plant for which will be engineered by Simon-Carves Ltd. (*CHEMICAL AGE*, 14 June, p. 1110) it is understood that the design study is now being compared by UK Atomic Energy Authority with other processes, particularly with regard to costs.

Hydrogen distillation was developed in conjunction with AERE, Harwell, and information on this work was announced at the Low Temperature Symposium held in London (see *CHEMICAL AGE*, 7 December 1957, p. 923, abstract of paper by Denton, Shaw and Ward.)

### Machine for Handling Foaming Liquids

Dispensing of highly frothing liquids can be carried out using the Waddington-Duval can-filling machine shown by *Liquid Systems Ltd.*, Croydon, Surrey. Frothing is prevented by a patented filling lance which is lowered to the bottom of the vessel to be filled before any liquid flows. The rate of filling is controlled automatically so that filling starts very quietly and continues evenly.

For non-foaming liquids the operation can be adjusted for full-flow filling from the start, thus cutting down the operating time.

Dimensions are 3 ft. by 3 ft. by 6 ft., and the machine fills 1, 2, 3, 4, 5 and 10 gall. containers. It will handle up to 60 tons a week of foaming liquid.

### Plastics-coated Steel Shown in New Form

Stelvetite, the new plastics-coated steel sheet recently introduced by *John Summers and Sons Ltd.*, Shotton, Chester, was shown for the first time on the stand of *B. X. Plastics Ltd.*, who collaborated with the development. A new form of the material—with a laminated Cobex-Velbex p.v.c. surface—was specially produced for

the exhibition. Various samples of Stelvetite in different colours were displayed with examples of its applications which include roofing sheets, ducting, drums, containers and tanks.

This new material, the only British product of its kind, is strip mill cold reduced steel sheet to which is permanently bonded on one side a sheet of specially formulated high quality p.v.c., the other side being electro-zinc plated.

Stelvetite is said to combine the strength and rigidity of steel with the corrosion resistance of plastics; it also eliminates several costly finishing processes.

Visitors to the stand were interested in its application in fume ducting, drums and other containers. Containers made from Stelvetite are chemically resistant to dilute aqueous solutions of most common acids at room temperature, alkalis, oils, fats and aqueous solutions of inorganic compounds, but would not be suitable for use with aromatic hydrocarbons, chlorinated hydrocarbons, ketones, esters or ethers.

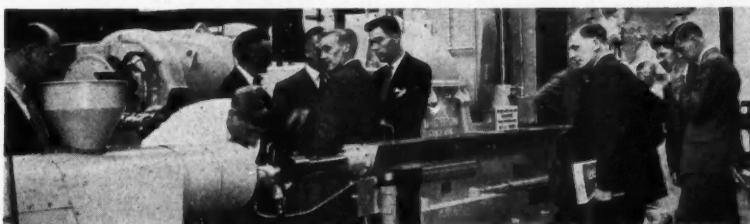
The new Cobex-Velbex laminated Stelvetite, now available for flat surface work, provides a much higher degree of chemical resistance—the Cobex being outermost.

Stelvetite is produced in steel gauges from 16 BG (.0625 in.) to 26 BG (.0196 in.) in widths up to 4 ft. and in lengths up to 12 ft. or more. It is supplied in five standard colours, with other colours and a variety of embossings available to special orders. The Velbex p.v.c. coating is .014 in. thick, with the special Cobex-Velbex laminate .024 in., for all steel gauges.

### Orders Taken for Temperature Recorder-Controller

What is claimed to be the World's smallest temperature recorder-controller was shown by *Electroflo Meters Co. Ltd.*, London NW10. Working from a thermocouple input, the instrument incorporates a special linkage which gives a straight line trace. At the same time a 3-15 p.s.i. output is provided.

No standard cell is necessary and a



A group watching a 1 1/2 in. extruder extruding black polyethylene pipe on the stand of Baker Perkins



Two representatives of Electroflo Meters Co. on their company's stand are l. to r. Mr. F. Chaventré and Mr. G. Axworthy

standardising check is incorporated. The trace paper feeds automatically on to the rewind spool and can therefore be broken and removed at any time without causing any delay.

Two large oil companies are reported to have ordered 50 each of these recorder-controllers.

### Metering of Liquids

A system for the accurate dispensing of liquids was shown by *Measurement Ltd.*, Oldham, Lancs. Using a typical control console as demonstrated it is possible to meter fixed quantities of liquids from one of a number of storage containers into a reaction or other vessel.

Typical example is a console supplied for blending edible oils, stored in 10 tanks, by automatically dispensing preset quantities into any one of four blending tanks. A mimic diagram complete with coloured signal lamps indicates the selected tanks and also shows when the meters, valves, pumps and indicators are energised.

A Power-Samas punched card system has been used to control the equipment.

### Good Business in Descaling Machines

In the first four days of the exhibition *Industrial Descaling Tools Ltd.*, St. Albans, had sold £16,000 worth of their Lark 2000 air-operated portable descaling machines. Designed for the removal of rust, paint, scale, concrete splashes and all types of hard surface deposits, it will clean up to 160 sq. ft. per hour, claim the makers, leaving a surface ready for painting.

Two cutter bundles are incorporated, each containing 48 hardened and tempered alloy steel cutters. Wire brushes may be used to give an extra smooth finish.

### Heavy-Duty Compressors

Exhibiting for the first time their new rotary two-stage, oil-flooded sliding vane compressors, *Air Pumps Ltd.*, London SW20, displayed one of a number which are being supplied to South Africa for operation in an atmosphere heavily contaminated with rock dust, at 6,000 ft. altitude and 104°F ambient temperature. This is the model ARMD 625 mobile c.f.m. compressor.

These compressors are designed for either mobile or stationary application and are powered by either internal combustion engines or electric motors, with a range of capacities from 300 c.f.m. up to 600 c.f.m. free air delivered to BS 726, for working pressures up to 125 p.s.i.g.,

humidities up to saturation point, altitudes up to 10,000 feet and ambient temperatures up to 125°F.

### ICI Show New Uses for Titanium

Many of the newest uses for titanium in chemical plant were featured by *ICI Metals Division*, Birmingham. It was announced that the division had added to its range of wrought titanium products, tubes from 1/16 in. to 6 in. in diameter, copper cored titanium wire in various gauges for anodes, and a number of extruded sections.

Among the many applications of titanium shown was a titanium probe for a liquid level gauge by *Bailey Meters and Controls Ltd.*, the gauge exhibited being the prototype of a new model. Other examples included titanium mesh, a lined pressure vessel, an emulsion kettle and surgical implants.

A major exhibit on this section of the ICI stand was that dealing with platinum-coated titanium anodes for use in cathodic protection. With this new process, the platinum coating can be as little as 1/10th



Discussing titanium on the ICI stand are l. to r. Mr. M. Matsumura (*Suritomo Metals, Japan*), Mr. S. Fujii (*Suritomo Shoji Kaisha Ltd., London*) and Mr. R. J. Watkins (*ICI metals division*)

of a thou. thick. This technique reduces the number of anodes needed and enables the current density to be raised to a very high figure.

A demonstration of anodic protection showed that 40 per cent w/w sulphuric acid at 60°C was pumped continuously for 1,200 hours through a system fabri-

cated entirely from ICI titanium. Unprotected titanium would corrode at a rate of about 10 in. per year, but for a steady loading of only 50 volts/1,000 sq. ft. the corrosion rate was reduced to 0.0001 in. a year.

### Valves Designed for European Market

With the European market in mind *Langley Alloys Ltd.*, Langley, Bucks, are manufacturing Y valves to the German specification DIN 3790. There is no corresponding British standard for this type of valve.

DIN 3790 controls design and dimensions of cast stainless steel Y type valves suitable for working pressures of up to 25 atmospheres in sizes up to and including 32 mm-bore and 10 atmospheres in sizes up to and including 200 mm. bore. It is claimed to incorporate the best principles and common practice of main continental valve manufacturers.

It ensures standardisation and interchangeability between various manufacturers' valves, both as regards performance and, most important, the main renewable components. This has the effect of simplifying stock-holding of packing, bolting, handwheels, etc.

Dimensions fixed by it are (a) seat bore, (b) stem diameter and thread forms, (c) size and number of packing rings, (d) cover and gland bolts, (e) body and cover flange thickness, (f) dimension over flange faces, (g) handwheel diameter and taper square attachment.

Langley type 12,000 production valve, made in stainless steel (18/8/3 Mo), will conform to this standard, say the company. This valve has been designed for high purity and corrosive applications.

### Molybdenum for HV Furnaces

High vacuum furnaces with molybdenum framework and screens and tungsten elements are being produced by *Murex Ltd.*, Rainham, Essex, to customers' own designs (see *CHEMICAL AGE*, 14 June, p. 1119). This company, producers of articles in the rarer metals, e.g. titanium, tantalum, zirconium and niobium, have, since 1 May, reduced the price of titanium fabrications.

### Furnace Fittings

The main contribution by *Lake and Elliot Ltd.*, Braintree, was the manufacture of 'Millennium-Key' furnace fittings made under licence from and designed by the *W-K-M Manufacturing Co. Inc.*, Houston, Texas.

The company also showed high quality carbon, alloy and stainless steel pressure castings, both machined and unmachined, for valves, pumps, heat exchangers and tube supports.

### Compressor with Helically Fluted Rotors

The only exhibit on the stand of *James Howden and Co. Ltd.*, Glasgow, has been a Howden compressor. It is a rotary positive displacement machine, developed as an oil-free compressor/exhauster to handle gases. It consists of two helically fluted rotors, 'male' and 'female', housed in a casing and arranged to run with a clearance between

each other and between the rotor tips and the casing. These clearances are maintained by timing gears having a backlash considerably less than the inter-rotor clearance. The compression chamber can, therefore, be kept dry and the gas being handled is uncontaminated by the lubricating oil from the bearings.

The operating cycle of the compressor is similar to that of a reciprocating compressor; induction, compression and discharge. The gas is delivered with a non-pulsating flow, eliminating the need to install a receiver in most cases. There are no valves on the compressor. The standard range is from 800 c.f.m. to 8,500 c.f.m. with outlet pressures of up to 60 p.s.i.g. on a single stage and up to 150 p.s.i.g. in two stages. As an exhaustor with atmospheric inlet, the machine is suitable for sub-atmospheric inlet pressures down to 24-in. Hg vacuum (3 p.s.i.a. or 0.21 kg./cm.<sup>2</sup>abs.).

### New Range of Forged Flanges

A newly developed range of forged, alloy and stainless steel flanges in all sizes, plus cast, alloy and stainless steel pipe fittings, has been shown by *Wilson Pipe Fittings Ltd.*, Irvine, Ayr. These fittings are designed for special services, such as resistance to corrosion; low and high temperature conditions, including certain applications where resistance to creep is essential.

Also to be seen was a full range of Weldolets in carbon and alloy steels, manufactured under US licence. These reinforced pipe junction fittings are designed to give considerable reduction in hoop stress, while retaining good flow conditions.

### Metal Propellers' Brochure

A new 24-page brochure was produced for the exhibition by *Metal Propellers Ltd.*, 74 Purley Way, Croydon, Surrey. Entitled 'Serving the oil and chemical industries', it has an index that takes the form of a process plant flow diagram picking out the equipment made by the company in stainless steel and other heat and corrosion resistant alloys: distillation columns, tower internals, reaction vessels, heat exchangers, evaporators, mixing and blending vessels, etc.

Visitors learned that the maximum weight vessel which Metal Propellers can lift—26 tons—was increased from 20 tons during the time that the brochure was being printed.

### Dalglish Installing Conveyor Driers at French Works

Two conveyor driers for butyl rubber are being installed by *John Dalglish and Sons Ltd.*, Thornliebank, Glasgow, at Port Jerome, near Le Havre, France, for Socabu, a combined company of Michelin Tyres, Esso, Kleber Colombes and Gas de France. These machines are similar to ones built by Dalglish's associates, Procter and Schwartz Inc. of Philadelphia, US, for the Standard Oil Co.'s refinery at Baton Rouge, Louisiana.

Capacity of the new equipment will be 3,450 lb. dry material per hour from 50 per cent moisture to 0.5 per cent. It is installed on a ramp of 7° elevation. The feed end is at ground level and the deliv-

Dalglish conveyor drier in course of construction



ery end about 12 ft. above ground.

The drying chamber is divided into four stages. The first two have three fans each and the second two have two fans each. Insulating panels inside the drying chamber are of non-metallic construction because corrosive fumes are emitted during the drying.



The 80-ft. high benzole distillation column shown by APV. Diameter is 4 ft. 6 in.

### New Tube Expander

For the first time, *Charles Wickstead and Co. (1920) Ltd.*, Kettering were showing a tube expander torque control unit suitable for the portable electric drill type motor. It has been developed for the control expansion of heater- and condenser-type tubes. A manually adjustable pointer in a meter is preset so that when the maximum torque required is reached the unit stops, pauses and then reverses automatically.

Also shown for the first time was

a new type of internal tube cutter, particularly suitable for small bore tubes in the  $\frac{1}{8}$  in. to 1 in. bore range. These have been developed to meet the demand for tube cutters for very thick tube sheets which will shortly be brought into service, particularly for heat exchangers. Also of interest was a tube splitter which splits a tube stub longitudinally and makes removal easy. This is used in an air chisel type tool.

### Nitrogen Output in Line with Consumption

AIKMAN's half-yearly report on the nitrogen industry shows that world supplies of and demand for nitrogen products are more or less in line with each other and the surplus has disappeared.

Over the past few months, the nitrogen market has seen a considerable improvement. Production has been less than expected due to the fall in US steel output and some cut-backs while consumption has increased.

Apart from US ammonium nitrate (33.5 per cent of normal) and liquid fertilisers, stocks are reported as being normal. It is hoped that prices for nitrogen fertilisers, which a few months ago reached a new low, may now become somewhat firmer.

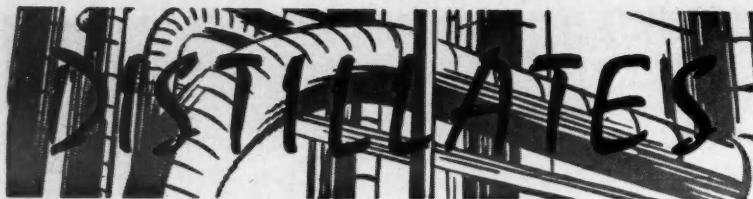
### KID Time Limited Extended

The Board of Trade has extended by two weeks to 4 July the time limit in which requests for exemption from key industry duty of specific articles may be made. With the entry into force on 1 January, 1959, of the 1958 Import Duties Act, consideration will be given to key industry duty exemption for the period 19 August to 31 December, 1958, of only those articles where specific requests have been made.

Visitors on the Balfour Group's stand







★ A SLICK piece of co-operation between two chemical plant manufacturers and a chemical producer solved a last-minute crisis on the Olympia stand of the Power-Gas Corporation and ably demonstrated that firms are willing to help one another, even when there is no prospect of gain. A feature of the Power-Gas stand was to be a fully-operating model of an evaporator type crystalliser.

The glass-centre column in this all-glass unit broke at 11 a.m. on the day before opening. Since Quickfit and Quartz who supplied the glass for the model were also exhibiting at Olympia, they were asked if they could carry out an emergency on-the-spot repair. This was not possible and while their works in Staffs could have produced a duplicate fairly quickly, this could not have been arranged in time. Quickfit appealed to British Drug Houses, whose glass-blowing unit came to the rescue. A facsimile of the column was quickly blown and rushed to Olympia by 11 p.m. the same day. By working through the night, Power-Gas had the exhibit working in time for the first visitors who arrived at 10 a.m. the next morning.

This Krystal demonstration unit was shown in CHEMICAL AGE preview of the exhibition (14 June, p. 1110).

★ OLYMPIA has been full of interest for visitors who took the trouble to ferret. Much of this has already been reported in CHEMICAL AGE of 14 June, and other new work is covered in p. 1195 of this issue. One of the many items to attract attention was the new water deioniser shown by Griffin and George (see p. 1197).

I learned from the company that a short while ago, one of the largest transistor producers in this country was faced with a percentage of rejects of complete transistors that remained alarmingly high, despite all attempts to bring it down. The cause was ultimately traced to the water used for the washing and rinsing of germanium components.

Plant was already installed for the production of deionised water, but being piped through stainless steel ducting, the water acquired sufficient ions to raise its electrical resistance and contamination of the parts resulted. The remedy was the installation at each point of application of a small mixed bed deioniser which, since almost pure water was being fed into it, gave, per unit, some thousands of gallons of completely pure water.

★ REDUCTIONS of up to 90 per cent in the annual subscription rates of three major Soviet chemical journals in

translation will be welcomed by users of this service. These cuts have been made as a result of an arrangement with the US National Science Foundation and Consultants Bureau Inc. of 227 West 17th Street, New York, the firm which initiated cover-to-cover translation of the journals nine years ago.

Providing translations of Soviet material has always been costly. For a complete translation of the *Journal of General Chemistry*, the oldest and the major USSR chemical journal, the cost was previously \$170. Now the charge to non-profit research and academic institutions is \$30 and \$90 for others. The price of the *Journal of Applied Chemistry* has been cut from \$95 to \$20 and \$60 respectively. *The Bulletin of the Academy of Science, Division of Chemical Science*, is cut from \$150 to \$15 and \$45 respectively.

★ I WAS particularly pleased to see in Frankfurt the special catalogue printed by A. Gallenkamp and Co. Ltd., for the Achema. This is a comprehensive illustrated list of the company's products and is printed in English, French and German. I gather that about 25,000 copies have been printed for world circulation.

UK firms are often criticised for not providing literature in foreign languages and this catalogue is a good example of how to sell in Europe. The publication of multi-language catalogues was well in evidence at Achema, but not, I am afraid, at the Chemical and Petroleum Engineering Exhibition held at Olympia this week and last.

★ NEWS that Russia has signed a contract with a US concern for the supply of equipment etc. for three large synthetic fibre plants, a contract in which two UK companies are also concerned, has once more turned thoughts to that favourite topic—ICI negotiations with the USSR over Terylene licences and know-how.

Unfounded reports in Manchester newspapers suggested that Russia's textile industry was expected to conclude 'a multi-million pound deal with ICI.' It was even estimated what the initial payment would be (several million pounds and royalties bringing in another £250,000 a year).

I can confirm that ICI are ready and willing to exchange 'know-how' and allow the USSR to have licences on polyester fibre (Terylene). Negotiations have in fact been under way since 1954 between ICI and the Soviet textile industry on the price to be paid. Indeed, as I understand it, ICI would like to settle matters one

way or another. However, the wheels of the USSR grind slowly, negotiations regarding money being long-drawn out with lengthy intervals between contact.

I, for one, and I am sure those companies who have had approaches from the USSR, would like to know if any company has had a firm offer from the Soviet (apart from the Von Kohorn deal). I cannot help feeling that all this talk about USSR orders could well be another move in Krushchev's game of politics.

★ UNDER the stimulus of a Government order to reduce their dollar expenditure, the UK photographic industry in 1946 had to set about building up a new industry, the production of the film base on which sensitised photographic emulsion is coated. The firm most concerned was Ilford Ltd., and after consultation with BX Plastics, in which Distillers Co. have an interest, Bexford Ltd. was founded as an associate.

The plant which resulted, was started from a piece of marshland and has now grown into a £2½ million factory at Brantham, near Manningtree, Suffolk. It is the only film base production plant in the Commonwealth. The new factory now not only supplies a large proportion of UK requirements, but has even started to export to the US. The saving to this country is in the region of \$5 million a year.

The necessary process was discovered, mainly by trial and error; special machinery had to be built. There can be no doubt that the Government ruling of 1946 was a sound one for since the National Health Service began, radiography has nearly doubled. In 1948-49, 7,870,984 people were X-rayed in British hospitals. By 1956 the figure had risen to more than 13 million.

★ SINCE 1918, when its Institute of Industrial Chemistry was formed, the Worshipful Company of Salters has taken an active interest in the training of chemists. Ninety-eight research fellowships have been awarded and since the research scholarship was instituted in 1951, 28 students have been elected.

Now I am interested to learn that another step has been taken. In arrangement with the Royal Institution, the company is to sponsor lectures to schoolchildren in some of the interesting branches of chemistry. These, I understand, will be on the lines of the lectures related to physics which have been given at the RI in recent years.

In addition, the company has decided to make grants to headmasters of certain selected public schools from which 'Salters' Exhibitions' may be awarded to deserving boys who might otherwise be unable to complete their education.

Every action which increases the number of trained chemists is to be welcomed and I congratulate the Salters' Company on their enterprise.

*Alembic*



# Organisation of Chemical Engineering Projects

## Joint Symposium at Olympia

**C**OINCIDING with the Chemical and Petroleum Engineering Exhibition, on 24 to 26 June inclusive, a joint symposium on 'The Organisation of Chemical Engineering Projects' was held at Olympia, London, by the Institution of Chemical Engineers and the Institute of Petroleum. It was the 17th meeting of the European Federation of Chemical Engineering and some 600 persons registered to attend the symposium.

The following papers were read: 'The organisation of chemical engineering construction projects,' Sir Leonard Owen and C. J. Turner (UK Atomic Energy Authority Industrial Group Headquarters, Risley, Warrington, Lancs.). 'Design data and specification of requirements including site selection,' J. P. Asquith and L. S. Davis (W. T. Fraser and Co. Ltd., Harold Hill, Romford, Essex). 'Systems of Project Organisation,' K. M. Curwen (Albright and Wilson (Mfg.) Ltd., P.O. Box No. 3, Oldbury, Birmingham). 'A System of project organisation,' R. E. Bywater (Simon-Carves, Ltd., Cheadle Heath, Stockport). 'Functions of the

Contractor,' L. B. Baker (Stone and Webster Engineering Ltd., 20 Red Lion Street, London WC1). 'The Function of the Contractor,' W. H. A. Webb (A.P.V. Co. Ltd., London SW18). 'Programming and progressing systems and meeting completion dates,' J. O. Dugdale-Bradley, Shell Chemical Co. Ltd., Clement's House, Gresham Street, London EC2, and a second paper on the same subject by W. V. M. Kelly (Power-Gas Corporation Ltd., Parkfield Works, Stockton-on-Tees) 'Cost estimating and control,' P. Brett (Imperial Chemical Industries Ltd., General Chemicals Division, Weston Point, Runcorn, Cheshire). 'Plant commissioning,' D. W. K. Barker (British Petroleum Co. Ltd., Britannic House, Finsbury Circus, London EC2). 'Plant commissioning. Commissioning a coke oven plant,' A. F. Cottrell (Woodall-Duckham Construction Co. Ltd., 63-77 Brompton Road, London SW3), and 'The analysis and future use of project records,' S. T. Card (Distillers' Co. Ltd., Engineering Division (South) Devonshire House, Mayfair Place, Piccadilly, London W1), and a second paper on the same subject by R. Adams, (George Wimpey and Co. Ltd., 26-28 Hammer-smith Grove, London W6).

## Organising the Construction of a Major Chemical Plant

**A**N outline of an organisation suitable for dealing with design and construction of major chemical plants in an economic manner within the shortest practicable period of time was given by Sir Leonard Owen and C. J. Turner of the UK Atomic Energy Authority Industrial Group. The working of such an organisation was illustrated by examples from the chemical plants built at Dounreay to support the operation of the experimental fast breeder reactor.

The engineering branch, suggested the authors of this paper, was entirely responsible for capital construction with obligations to complete each project within the cost sanctioned by the board and within the time specified, to ensure that the plant fulfils adequately and economically the duty which had been defined, that layout of buildings and plant was pleasing and convenient, and that the design complied with statutory regulations.

Responsibility for manning, operation and maintenance of completed plants was vested in the operations branch, whose aim, while achieving the specified outputs, was to find ways and means of improving the plants as a result of operating experience. The research and development branch had to provide both the information needed for design of the chemical plants and additional data required for

operation. Market research, sales and framing of long-term policy lay with a technical policy branch. The functions of the other branches were self-evident.

It was the task of the process engineer to develop general schemes for each plant, taking as his basis the flow-sheet and other information made available by the research and development branch and translating this first into the form of plant-flow diagrams in which the number and size of process vessels were fixed, the method of transfer of materials between these vessels was indicated, the measurements needed for control of processes were shown, and the requirements set for steam, water, electricity and other sources. From this presentation the project engineer then had to produce engineering schemes, true to scale, in which the process plant was conveniently and economically housed. Not only had construction and maintenance facilities to be provided for but the whole plant and its individual sections had to be envisaged from the point of view of the process operation. The main scheme had to be developed with due regard for fire, escape of toxic material, level of radioactivity in working areas etc.

On a large project, demands for mechanised and electrical equipment emanated from a number of design-sections and it was convenient to channel

these, prior to tender-action, through a buying engineer with a small staff.

Alongside the buying engineer was a group of inspection and progress engineers whose duty was to ensure that each item of plant was delivered by the required date and to see that the quality of materials and workmanship was of the right standard.

To pick up the threads of building work and civil engineering it was necessary to revert to the second 'layer' of the engineering branch organisation. In drawing out the main schemes for the chemical plant, the project engineer should take advice from the architect and structural engineer. At the stage when the main plant layout was 'frozen' the project engineer should issue his requirements for building work to the architect in the form of layout drawings, fixing overall sizes of building, giving general floor-loadings and the weight of individual items of plant, and showing any areas for which special treatment might be required, e.g. acid-resisting construction, fire-resisting features etc.

Layout of an establishment was built up by the civil engineer who took direct from the project engineer, the 'skeleton' requirements of each process-building. From the architect he receives preliminary details of 'service' buildings. With this he can build up a factory layout.

In the letting of contracts for building and civil work, most of the work will fall within the scope of a main civil contract. If time was available for detailed drawings and firm specifications, then the lump-sum contract was preferred as it gave economy through competitive tendering.

With a series of buildings involved, it was convenient to let a contract at prices based on the typical units and applicable to the whole range of buildings. Scheduled-rate contracts obtained competition without repeated tendering and avoided the use of a large number of contractors on one site. The quantity surveyor, however, had to provide a site staff to carry out measurement of work for the resident engineer. Other work to be performed on the site such as erection of pipework etc., had to be covered by contracts of the 'works' type. Wherever practicable, lump-sum contracts should be employed and daywork contracts avoided, stated Sir Leonard and Mr. Turner.

In any large construction and user organisation it was important to give careful attention to the standardisation of tools and components in common use. Large numbers of items such as valves, piping, joints, steam-traps etc., were required in initial construction of the process and service plants and many would have to be held in stock for plant maintenance. It was possible in many cases to secure advantageous terms by purchase of consumable stores by running contract.

The engineering branch should obviously include a construction engineer with responsibility for supervision of all site-work. He would then need to

appoint a resident engineer with a suitable staff at each site of work. The resident engineer required copies of drawings and contracts placed for manufacture of plant and equipment at maker's works, so that he might check the condition of plant on arrival at the site. From each design section he should receive drawings and written instructions concerning the work to be performed on the site. In the case of works' contracts it was usual for detailed instructions to be given by the resident engineer to the contractor's site agent.

It was the planning engineer who had the important work of preparing programmes, first for the whole project and, later, for its constituent parts. First objectives of programming were to pinpoint the features which really set a lower limit to the period of construction for the complete project. Close attention could then be paid to these features.

For solution of most of the technical problems confronting him the project engineer depended on information from the research and development branch. Because most of the project engineer's staff engineers had only a general knowledge of chemical engineering and plant operations, it was good practice for the project engineers to have the support of

a chemical adviser, who should be a proficient chemist and chemical engineer and have had good experience of plant operation. The chemical adviser should work with the project design teams and be available constantly to give advice on flow-sheeting, chemical engineering features, and practical operation problems.

Information reached the project engineer from a number of sources and sometimes proved to be conflicting. Co-ordination of design could be obtained by means of a design-committee meeting regularly under the chairmanship of the director of engineering. Similarly a progress-committee, again meeting under the director of engineering, could co-ordinate construction.

Responsibility for financial control of the project was as follows: the estimates and sanctions engineer was responsible for the preparation of cost-estimates furnished by the project engineer and specialist design sections. The project engineer co-ordinated the estimating and saw that all estimates were complete and correct. A careful watch was then kept on expenditure as indicated by monthly returns of costs and commitments for each job. The project engineer had to bear full responsibility for any deviations from the estimated costs.

## Project Organisation from the Contractor's Viewpoint

WRITING from the point of view of the contractor, R. E. Bywater (Simon-Carves Ltd., Cheadle Heath, Stockport) described how the contractor organised his staff to deal with all aspects of the project. In the planning section, the planning engineer prepared a construction programme which became the basis of the drawing and purchasing programme. He had to watch the progress of drawing work throughout the duration of the contract.

Heads of sections concerned with civil engineering, instrumentation, electrical engineering and mechanical handling had to put work in hand as required by drawing and construction programmes.

During the planning stages it was recommended that advance purchase orders were placed so enabling raw materials and also workshop capacity to be reserved.

The drawing office was the heart of the contractor's organisation. Final plant layout assumptions made in tendering had to be confirmed with the client and future developments had also to be borne in mind.

Material lists prepared during the planning period were found to prove invaluable as a check on purchasing. Of importance was the close liaison between the buying and the progress and inspection sections. Advantages could be gained also from combining estimating with buying. The size of the organisation determined the best arrangement for purchasing.

For costing purposes a regular and organised system of control was essential. The contractor had to know during the currency of a job whether or not it was

running to the estimate of cost and completion date. Otherwise it could be disastrous if the results were not known until the end of the contract.

At monthly meetings or more frequently, the chief contract engineer should review progress of design, material deliveries and erection.

When drawing-work and purchasing were sufficiently far advanced, the contract engineer prepared a list of recommended spares for about 12 months' service.

The two separate functions of progress and inspection of materials were usually combined under one control, copies of purchase orders were passed to this section and a variety of systems had been developed for recording the required information.

Inspection during fabrication and on completion was carried out by a team of qualified inspecting engineers who passed their reports to the contract engineer for initialling and for him to indicate what action should be taken; sub-contractors were required to produce test certificates, performance curves and other reports applicable.

Mr. Bywater then considered 'erection' having regard to equipment and staffing, the site engineer, safety, erection costs and site progress-meetings.

The site engineer was, of course, responsible for correct installation and alignment of all equipment. Possibly test-runs under load could be better dealt with by commissioning or operating engineers. Pre-commissioning in any event should be clearly defined as to whether it was a duty of the erecting or commissioning staff. Prior to running-tests, lubrication had to be thoroughly carried out under

careful supervision and it was desirable that the client should provide labour for this purpose so that his men could become acquainted with routine lubrication requirements. The client's maintenance staff should also take an active part in running tests and pre-commissioning in order to become familiar with the plant.

In a brief consideration of financial settlement, Mr. Bywater said it was inevitable that during execution of a contract modifications arose which affected contract-price. These had to be carefully recorded by the contractor and a system agreed by the client for making the subsequent financial adjustments.

The system described by Mr. Bywater was considered to be sufficiently flexible to permit its adaptation to any type of chemical plant project.

Further papers will be summarised in our next issue.

## ABCM Talk on Measuring Productivity

OUTPUT of the UK chemical industry had doubled in the past 10 years, Mr. M. Viviani, work study and productivity officer of the Association of British Chemical Manufacturers, told Scottish area members on 20 June when he spoke on 'Measurement and productivity'. To achieve this the chemical industry had increased its labour force by only 20 per cent.

In the industry in that period there had been an increased output per unit of labour of about 65 per cent, the highest level achieved in any British industry. There was still no completely satisfactory method of measuring productivity. The purpose of productivity measurement indices was primarily to compare the efficiency of an organisation with others or to relate progress to achievements in the past. It was a worthwhile exercise and could be used effectively to assist management in measuring its progress and efficiency.

If Britain were to catch up with the US standard of living the productivity had to be increased, measured as output per unit of labour, by about 10 per cent per year. In practice the figure was at best about 3½ per cent, although the chemical industry was undoubtedly showing the way with an increase of about 8 per cent.

Mr. Blair Watt, of British Hydrocarbon Chemicals Ltd., Grangemouth, presided.

## New Polyester Dough Moulding Compound

A NEW polyester dough moulding compound which is free-flowing and cures rapidly at low pressures is now being manufactured by British Resin Products Ltd. The compound, Rockite K.501, consists of an unsaturated polyester resin, glass fibre reinforcement and a mineral filler. Mouldings in this material possess high impact strength, excellent electrical properties and good dimensional stability. Their heat resistance is good and they are said to retain a high level of mechanical strength even after prolonged exposure to temperatures of up to 200°C.

Rockite K.501 is supplied as a fibrous dough and is available in natural, black and a limited range of colours.

# NEW EQUIPMENT SHOWN AT FRANKFURT ACHEMA

## Second Chemical Age Review

**N**EW products, processes, plant and instruments shown at the 1958 Achema, held 31 May to 8 June, were reviewed in CHEMICAL AGE last week, when the exhibits of UK firms were particularly featured. Below we cover a further selection of the more interesting exhibits.

A model of a furnace with a capacity of 5,000,000 k.cal./hr. at about 370°C was featured by *Muller-Schuss AG*, Weidenau (Sieg).

Also on show was a new development in the form of a rotating column built according to the Kirschbaum system, which operates with only a fraction of the pressure drop of other well-known types of column and therefore enables vacuum rectification to be carried out in plants, at absolute pressures of as little as from 1 to 20 tor.

*N. V. Nautamix*, Haarlem, Netherlands, exhibited a Nauta ultra rapid mixer, and a Nauta-Combimixer with a total height of more than 4½m. and a width of about 3½m. occupied the greater part of the stand. This Nauta-combimixer with a working capacity up to 10,000 l. was composed of two Nauta ultra rapid mixers, the containers of which are partially combined.

The Nauta-combimixer is equipped with two Nauta-Microjet injectors by means of which it is possible to add liquids to powdered or granular products without lumps.

*W. J. Fraser and Co. Ltd.*, Romford, are licensees for this equipment in Britain and the British Commonwealth.

### Producing Gas from Solid and Liquid Fuels

New processes and apparatus for gas production from solid and liquid fuels, for the counter-current extraction of two liquid phases, for the construction of industrial furnaces and for the recovery of coal by-products were featured on the stand of *Dr. C. Otto and Comp. GmbH.*, Bochum. A model of the new Rummel slag bed producer was shown which gasifies both fine-grained solid fuels of any grade from peat or lignite to anthracite, even with high ash contents and liquid fuels as oils and hydrogenation residues. Lean gas, water gas, synthesis gas or town gas are stated to be produced with high throughput rates and high gasification, thermal and carbon efficiencies.

A mounted Podbielniak centrifugal multi-stage extractor was said to indicate new possibilities in counter-current extraction. Emulsifying liquids or liquids with suspended solids can be handled.

A new kind of bottom device for fluidised bed kilns, e.g., for lime kilns or for the production of lime-nitrogen, and the Otto ion-exchange process for ammonia recovery on carbonisation plants and chemical works, completed the exhibit.

A model of a Danor hydro-cyclone

represents a new machine developed by *Passavant-Werke*, Michelbacher Hutte, Michelbach, Nassau. The plant has a variety of uses, but is used principally for the removal of sand and other granular materials from muddy water supplies. Another model showed the working of a rotatory sludge remover of heavy construction which can also function as a sludge thickener.

A filtration machine using sonic vibrations offers a novel approach to problems in the extraction, separation and classification of solid, sub-solid, viscous, slimy or mixed materials, and in concentrating these from liquids of all kinds. Exhibitors of the machine were *Reinische Werkzeug und Metallwarenfabrik GmbH.*, Rhewum.

A screen or filter cloth is arranged in a catenary curve over a discharging funnel. One side of the rectangular fabric is tightly clamped at one side, the opposite side is agitated through a strip which is fitted to it by means of an electro-magnetic vibrator. A basic vibration of 100 c./sec. is created, upon which are superimposed very high harmonic vibrations. The action of these is such that during filtering or screening, the material forms into a roll which rolls fairly slowly towards one end of the filter cloth as caused by a thrust in the fabric. The actual working surface remains open for the passing of the liquid phase of the material. Several such filter surfaces can be combined in a battery.

Representing a further step towards the automation of filter presses is that designed by *Riltershaws and Blacher*, Wuppertal-Baunten. The press has a fully hydraulic closing device controlled by a contact manometer, which ensures a uniform contact pressure of the plate packets. Suspension of the plates makes one-man operation possible.

### New Filtering Equipment

New designs of the filtering equipment, supplied by *Schenk Filterbau GmbH.*, Schwab. Gemünd-Waldstetten, were displayed. Chemical resistance of existing models in corrosion-proof aluminium alloys has been improved by the use of high-grade synthetic coverings. In addition to well-known filtering media based on cellulose and asbestos, sintered metals and sintered synthetics can be used, it is stated, with or without auxiliary paper-like filtration inserts.

Specially constructed for the exhibition by *Benno Schilde Maschinenbau AG.*, Bad Hersfeld, was an air stream drier, fitted with a short flow pipe. The drier included an inlet centrifugal fan, dust separator and a wet separator for final dust removal. Special features were the rounding off of all flow sections by panel beating, ground and polished welded seams and a

practically jointless connection of the flow pipe flanges. Air drier pipes were fabricated by welding sheet metal.

A hydro-pneumatic filter press was shown in operation by *F. H. Schule GmbH.*, Hamburg. The control elements of this filter press automatically adjust themselves to the nature of the material to be filtered. The press is equipped with a new type filter plate where the filter cloth no longer seals the filter chamber. The service life of the filter cloth should therefore be considerably prolonged. The filter plates can also be fitted into any other filter press.

A prototype glass-fibre tank lined with furan having a capacity of 1,500°C and a reactor vessel of the same materials were featured by *Schweimer Eisenwerke-Müller GmbH.*, Schwelm/Westphalia. Should there be a marked interest in these new pieces of equipment, then the company will start commercial production.

Also on show by this company was a laboratory glass-lined reactor vessel. This had a capacity of 10 gall. and an anchor-type stirrer. Cleaning of this vessel was effected by hydraulically raising the top of the vessel and lowering the bottom section. The motor is explosion-proof. British agents for this company will be QVF Ltd.

Precoat filters were stressed on the stand of *Schumacher'sche Fabrik*, Bietigheim/Württ. These are of interest to the chemical and pharmaceutical industries, refineries, sugar works, etc. The ceramic tubes are coated with kieselguhr and are stated to filter effectively slurry or fine colloidal solution. Such filters are understood to be in use at Brown and Polson's Paisley factory.

### US Firm Introduces New Pump

*Vanton Pump and Equipment Corp.*, division of Cooper Alloy Corporation, Hillside, NJ, US, announced the availability of a pump in which fluids handled are in contact only with Teflon or Kel-F elastomer.

Since shaft seals and stuffing boxes are eliminated in the Vanton pump design, fluids or slurries are wholly isolated in a passage formed by the outer surface of the Kel-F elastomer liner and the inner surface of the Teflon or Kel-F body block. Operation of the pump is by means of an eccentric shaft and rotor assembly rotating within the liner and progressively pushing the fluid about its outer surface. Capacities available to 20 g.p.m. with pressures to 50 p.s.i.

Vanton are making the first all-plastics gate valve specifically designed to meet the problems of conveying corrosive and abrasive liquids in lines that cannot be chemically contaminated. In designing this new product, called the Flex-Plug gate valve, both the straight-through flow, non-pressure drop characteristic of a gate valve and the throttling, flow-control feature of a globe valve are combined, allowing for wide versatility of application.

It is available in 1-in. and 2-in. sizes with screwed ends. The ½-in. through to 4-in. sizes are expected to be available shortly.

The Flex-Plug gate valve is offered in both rigid p.v.c. and styrene-copolymer.



It operates by the closure of a resilient and easily removable synthetic cap on the inside of the body.

As a result of further development Permax protective lacquer is now available from *Spies, Hecker and Co.*, Köln-Raderthal, which is stated to exceed the *Vetrodur* and *Permax* products in resistance to chemical attack.

A heat exchanger, developed by *L. and C. Steinmüller GmbH.*, Gummersbach (Rhld.), is stated to have the following advantages: Ball-shaped header with relatively thin walls instead of thick tube sheets; low pressure loss; favourable ratio of weight to heat transferred; plant can be completely vented and drained; easy removal of tube bundle; all tube welds accessible through manholes.

Due to the absence of thick tube sheets the heat exchanger, type KS, weighs little and is moderate in price.

Under a permit from *Farbwerke Hoechst, Virus GmbH.*, of Bonn, were exhibiting Gasofract, for the separation of gases up to 260°C. The apparatus is offered for sale at £850, which is stated to be about half the cost of the comparable US equipment.

*Weineck GmbH.*, Düsseldorf, reported that they can now deliver crystallising plant, which makes it possible to obtain a much larger crystal grain than is usual. Extraction is improved, and loss caused by small grain is greatly reduced. The company also manufacture evaporating plant of corrosion-

resisting material for high capacities. They are said to have reduced the amount of heat required for this multi-stage plant.

Of interest on the stand of *Westfalia Separator AG*, Oelde, Westphalia, was the recently developed two-stage *Luwesta* (*Lurgi-Westfalia*) extractor which is protected against explosions and equipped with a new type of drive by a clutchless electric motor. The extractor has no worm wheel gear. Another type of industrial separator, designed for particularly high capacities up to 120,000 l./hr. (= about 26,500 Imp.g/h) is equipped with the same drive.

A further new development by this company is the hermetically sealed separator of hygienic design which can be supplied with stainless-steel lining.

Pneumatic driers and fitted driers with provisions which create particularly favourable conditions for heat transfer or for differential pressures were demonstrated by *Hans J. Zimmer AG.*, Frankfurt. In the pneumatic driers, material to be dried is first passed through a feeding device and then taken up by a stream of gas and heated in a tube. Separating devices follow this drying tube and provision can be made to use these devices for sieving. Special measures ensure favourable conditions for heat transfer (transition rate to material, about 300 kg./cal./m.<sup>2</sup>/°C); mild conditions of drying, short residence in drying tube and low heat consumption (about 1.5 kg. of steam per kg. of water evaporated).

allowing for direct heating or cooling. The heating or cooling agent flows through channels formed by the graphite plates on the one side, and the walls of the container on the other. The new corrosion-resistant lining is distinguished by superior heat-transfer capacity, high mechanical strength, and low installation cost. Other essential advantages claimed are short heating and cooling times, and, consequently, increased charge-frequency.

Among new developments shown by *Deutsche Steinzeugwarenfabrik*, Mannheim-Friedrichsfeld, was an absorption and cooling element of new design. It is said to be suitable for intensive exothermic absorption of gases; the heat generated is exchanged on the spot. Special advantages claimed: Large absorption and cooling capacity of any size can be secured by assembling single elements.

Also displayed was a dense ceramic material which is stated to show practically no heat expansion and therefore is resistant against temperature shocks. Coefficient of heat expansion of standard stoneware is  $4.0-5.0 \times 10^{-6}$  and of the new developed special mixtures only  $0.6 \times 10^{-6}$  (20-600°C). The material is acid-proof.

To improve the mechanical and thermal resistance of parts made of ceramic material, iron casings have been replaced with glass fibres reinforced polyester. An egg shape No. 1, 60 l. capacity, as well as flanged pipes with accessories and valves was exhibited.

A special process developed by the *Hagusta Co.*, Frankfurt, is electrophoretic rubber coating. Metal parts can be coated with rubber by this method which would otherwise be impossible or uneconomic to protect by other processes. Perforated sheet, sieve plates, split pipe and similar parts can be efficiently protected by this method, Hagusta claim. Corners and angles have rather thicker protective layers than flat surfaces.

### Corrosion-Resistant Alloys with Low Iron Contents

*Otto Junker GmbH.*, Lammersdorf, displayed corrosion-resistant alloys with low iron contents. These alloys are known as A 65 M and A 56 M and have analyses as follows: 65 per cent Ni and 30 per cent Mo, and 56 per cent Ni, 15 per cent Cr and 18 per cent Mo respectively. A 65 M is used where solutions have a reducing effect and A 56 M for those with an oxidising effect. Both materials are easily welded and may be obtained in the form of mould castings and centrifugal castings.

A rectification column of 50 l. for pilot work was shown by *Société des Verreries Industrielles Réunies du Loing* (Sovirel), Paris. The vessel of 50 l. capacity was heated by a jacket of 4,500 watts capacity and regulated by a 'simmerstat'. The stirrer of the vessel was of an entirely new conception. The joint surrounding the glass was of moulded Teflon (p.t.f.e.) to prevent corrosive attack. The helix was of moulded Teflon and the steel framework covered in the plastics material. The fractionating column, of 100 mm. diameter, was filled with small glass ressorts of 1 mm. diameter.

## Developments in Structural Materials Shown atACHEMA

**CRAFTSMANSHIP** in fabrication was demonstrated by two sectional models on the stand of *Aluminiumwerke Göttingen GmbH.*, Göttingen.

A jacketed vessel fitted with a stirrer—capacity 250 l.—with an internal heating coil and a flange-fitting motor, gave an indication of the present position of fabrication techniques in the field of container construction. There was also a thick-walled pressure vessel with an operating capacity of 800 l. in pure aluminium fitted with a cooling system and various types of transport containers for the chemical and pharmaceutical industries.

Bottles for transport are seamless and are supplied with narrow or wide necks. Barrels, of aluminium throughout, consist of two seamless halves joined by a single ring-shaped weld. High tensile strength is achieved by appropriate corrugation. Containers intended for expensive products are provided with inserts for the seams which enable the package to be emptied without leaving a residue.

Göttal transport and storage boxes in 10 standard sizes are also made with seams. The natural film of oxide on the surface of aluminium and its alloys can be reinforced and consolidated by a supplementary anodising process.

Under the *Gaflon* trade-mark, *Appareils Gachot*, Enghien (S. and O.) France, manufacture an extensive range of different parts in polytetrafluoroethylene, from the most simple ones such as rods, tubing,

sheets and band to the more complex stuffings and their solid or coated gaskets.

*Gaflon* is now available for moulded bottles for transport of corrosive and dangerous products such as hydrofluoric acid, bromine, hydrobromic acid, etc.

An autoclave was exhibited by *Asbest- und Gummiwerke Martin Merkel KG.*, Hamburg-Wilhelmsburg, consisting of p.t.f.e., with p.t.f.e.-coated shaft and with p.t.f.e.-coated heating- or cooling-coil.

A homogeneous tube of p.t.f.e., presented in action, and intended to serve as filter column or as gas-distributor, was also shown. A patent has been applied for the special processing method used in manufacturing this equipment.

P.t.f.e. coatings for tubes including flanges, as well of T-fittings, and of sounding-rods with flange, and glass-fabric reinforced sockets of large diameter, were demonstrated.

In the field of non-metallic materials of construction, *C. Conradty*, Nuremberg, showed products made of amorphous carbon and synthetic graphite (*Cecobon* and *Ecebon*). Both materials, resin-impregnated, are finding increasing application for use in chemical apparatus. By virtue of substantially improved impregnation processes and by using new type resins, amorphous carbon and synthetic graphite are now available which are both liquid- and gas-proof.

Another interesting exhibit was the lining of containers with graphite plates,



A new process (German Pat. No. 956369) has now been developed by *Fr. Kammerer Aktiengesellschaft*, Pforzheim, in which silver can be bonded securely to steel, if the former has been melted in the presence of atomic hydrogen. Advantage of the process is the bonding of steel and silver with an almost unlimited degree of adhesion without the necessity of using an intermediate alloy. The new method of preparing sheets consists in applying the silver in a molten condition directly to the steel and then rolling until the required thickness is obtained. The crystalline structure of the plated silver, stated to be very fine in texture, has resulted in a high resistance to corrosion.

A noteworthy exhibit by *Kronprinz Aktiengesellschaft*, Solingen-Ohligs, was an evaporator (made by Becker Bros., Beckum) in which the inner surfaces of the tubes have been polished by longitudinal grinding. It is claimed that the longitudinal grinding is superior to radial grinding because the microscopic ridges left by the grinding

lie in the direction of flow of the liquid passing through the tubes.

Kronprinz titanium tubes were exhibited for the first time, in both welded and welded-rolled types, as were zirconium tubes.

A new conical blender-dryer (capacity 1,000 l.) was displayed by *Pfadtler-Werke AG.*, Schwetzingen/Baden. These units are new in Germany. Considerable savings in time and costs are claimed by their use. Highly corrosive media can now be dry-blended in one operation within a few hours. It is not unusual to achieve residual moisture contents of 0.1 per cent or even less. Rotation of the conical shell accelerates drying and produces simultaneously a homogeneous product of an even blend. The shell may be operated under vacuum as well as with pressure. It is heated by steam, hot water or oil. It is stated to be suitable for granulates and powder.

Dip pipes, glassed on inside and outside, were shown in lengths which have not previously been possible.

(Istituto di Chimica Industriale del Politecnico, Milan).

Polymers of high molecular weight have been prepared by polymerisation of monomers containing silicon and an unsaturated vinyl group. From the crude products of polymerisation, it proved to be possible to isolate, by means of solvent extraction, non-crystallisable amorphous fractions and highly crystalline fractions having isotactic structure. Fractions of low degree crystallinity, composed of sterically blocked macromolecules, were also isolated. The highly crystalline fractions have elevated melting points which for certain polymers, i.e., that of polytrimethyl alkylsilane, can surpass 350°C.

### Determining Thiamine in Flour

'Experimental error in the chemical determination of thiamine in flour,' A. Mittwoch (J. Lyons and Co. Ltd., London).

Laboratory routine determinations regarding the thiamine content of flour are determined at J. Lyons and Co. Ltd. as follows: Extraction with cold, dilute hydrochloric acid, purification by washing with isobutyl alcohol, and estimation by the thiodiome method.

It was found that: (1) In experiments with added vitamin the degree of apparent recovery can vary between wide limits (90-120 per cent). This is reported to be due to day-to-day variations in the slopes of fluorescence curves for thiamine in pure solution and in the presence of flour solids. The recovery factor is stated not to be a measure of the accuracy obtained. Each determination is standardised by including a sample with added thiamine, and the duplication of results has proved satisfactory (co-efficient of variation 2.6 per cent).

(2) Systematic errors are liable to be incurred in the measurement of thiochrome fluorescence particularly the 'blank' reading. This error can be minimised, it is suggested, by the use of highly sensitive instruments with selective filters.

### New Engineering Block at Glasgow Royal College

The new £1 million extension to the Glasgow Royal College of Science and Technology was officially opened by Mr. John S. MacLay, Secretary of State for Scotland, on 6 June. The extension houses the chemical, civil, mechanical and mining engineering departments. The extension was financed partly by industry, to the extent of £363,000, and partly by the Government.

Equipment in the chemical engineering department includes: plate column distillation unit, Dorr thickener, pneumatic flotation cell, plate and frame filter press, freeze drying unit, Eimco rotary vacuum filter, mass transfer apparatus, and Othmer continuous distillation stills.

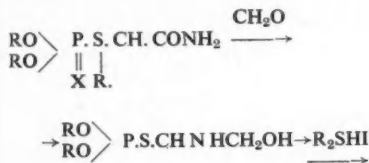
In the coming quinquennium, a new block is to be built for chemical technology.

## CA Summary of Section Papers at Joint Turin Congress

THESE further summaries of some of the section meeting papers presented at the recent joint Turin congress conclude our exclusive report of the proceedings. Other reports appeared in *CHEMICAL AGE*, 7 June, pp. 1019-1023, 14 June, pp. 1087-1091, and 21 June, pp. 1163-1166.

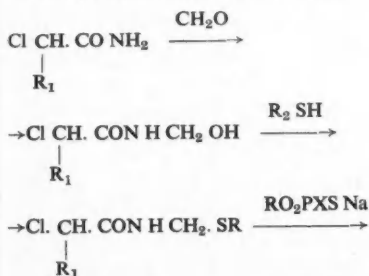
'New phosphoric esters with systemic insecticidal activity,' G. Rossi (Società Montecatini, Milan).

A new class of phosphoric esters is reported of the general formula:



where R=CH<sub>3</sub> or C<sub>2</sub>H<sub>5</sub>, X=oxygen or sulphur, R<sub>1</sub>=hydrogen, alkyl or phenyl and R<sub>2</sub>=alkyl or phenyl.

The syntheses were studied as follows:



For the most part, it is stated, the products obtained possessed a high general insecticidal activity accompanied by a conspicuous systemic activity, which make them suitable for practical use.

The effect of these products on biological activity has been examined.

### Quinolyl Thioethers with Fungal Activity

'New Quinolyl thioethers with antifungal activity,' F. Gialdi and R. Ponci (Istituto di Chimica farmaceutica dell'Università, Pavia).

Consideration of the relationship between structure and antifungal activity as revealed in a systematic study of series of mercaptoquinoline, diquinolyl disulphides and aryl, aralkyl-, and alkyl-quinolyl sulphides suggested the preparation and examination for antifungal activity of certain aryl-, aralkyl- and alkyl-6-quinolyl thioethers. The substances (not previously reported) were prepared by condensation of 6-mercaptoquinoline with the suitable halogen, with or without a catalyst according to Ulmann's reaction, or by performing the Skraup reaction on the suitable p-aminophenyl thioether. The structure of these sulphides was confirmed by oxidation with chromic acid to the corresponding sulphone.

*In vitro* microbiological tests have been carried out on strains representing the main groups of organisms found in fungal infections of man. Some substances of outstanding activity are reported. The results have been confirmed by direct comparison with some of the least known natural and synthetic fungicides available for therapy at the present time.

### Polymers of Vinylic Monomers Containing Silicon

'Isotactic polymers of vinylic monomers containing silicon,' G. Mazzanti, G. Natta, P. Longi and F. Bernandini

## HUMGLAS GET CONTRACT FOR CANADIAN THORIUM PLANT

A CONTRACT for the first Canadian thorium plant to be set up by Rio Tinto Dow (controlled by Rio Tinto Mining of Canada and Dow Chemical of Canada) has been awarded to Humphreys and Glasgow (Canada).

Work on the project, which will cost about \$1 million (£370,000), is to begin immediately. Capacity of the plant will be 100 to 200 tons of thorium salts annually. This tonnage is approximately equal to current world production of these products.

Site of the plant will be at the Algom Quirke property in Ontario's Blind River uranium camp. It is expected that the plant will be operating by next January and capacity should be reached in May, 1959. Production will consist of crude thorium concentrates, refined metallurgical grade thorium sulphate and thorium oxide. A Dow Chemicals process will be used and Humphreys and Glasgow will be adapting on a commercial scale a process evolved by Dow in small pilot plant.

Humphreys are still working on final engineering plans for the new plant but initial field work is expected to start immediately. They will be responsible for the design, engineering and construction of the plant itself, and for the installation

of the special equipment and machinery required for processing thorium.

During the past year Humphreys have already undertaken two contracts for Dow Chemicals of Canada—a new chlorine/caustic soda unit and the second a methyl chloride plant, both at Sarnia, Ontario.

Humphreys and Glasgow of Canada Ltd. is an associate company of Humphreys and Glasgow Ltd., London.

### Esso To Make Immediate Start on Milford Haven Project

The Esso Petroleum Co. are to go ahead with their plan to build a refinery and oil tanker terminal at Milford Haven, Pembrokeshire. Work on the site is to start immediately and the estimated cost of the project is £20 million. Initial plan is to process 4.5 million tons of crude oil a year.

### Extensions for Washington

Extensions covering about 30,000 sq. ft. are proposed by the Washington Chemical Co., Co. Durham. Plans are being considered by the local authority.

## Cyanamid Negotiate on New Oil Additive from Wool Grease

BRADFORD CORPORATION is having discussions with Cyanamid (Great Britain) Ltd., regarding a new oil additive required by the US parent which is to be made in Bradford and which, it is claimed, will lengthen the life of a car engine and improve starting in cold weather. The new product would be made from wool grease at the Esholt plant (Bradford) of the Corporation Sewage Department.

The Corporation, represented by Mr. W. H. Leatham (town clerk) and Mr. W. H. Hillier (Bradford Sewage Works manager and engineer) are expected to meet the company's representatives shortly to draw up an agreement. The product is to be made to the company's specifications for sale to them.

Cyanamid first approached Bradford

Sewage Works about three years ago, when they heard that the works were the largest producers of wool grease in the world. They had a formula which appeared to have possibilities for making an oil additive after chemical processing. Collaboration followed between Bradford's research chemists and the Americans and a pilot plant was set up at Esholt. The product has been tested in the US and at Cyanamid's factory in Paris. It is understood that the additive will be blended with mineral oil to form a kind of 'detergent for carbon deposits', which, it is believed, will prevent carbon deposits in the cylinders and prevent ring-sticking. It is also claimed that it may help starting in cold weather, a particularly useful feature for diesel engines.

## Long Load for ICI Olefin Plant



This 100 ft. long by 3 ft. in diameter steel column made by Head Wrightson for the ICI olefin plant at Wilton is one of the longest loads of its kind to travel by road. It is seen here negotiating a bend at Thornaby-on-Tees

## Plessey Demonstrate New Food Contamination Monitor

RECENTLY at the Ministry of Agriculture, Fisheries and Food, a team of engineers, led by Dr. Denis Taylor, a director and general manager of Plessey Nucleonics Ltd., Ilford, demonstrated and lectured to senior technical officers of the Ministry on the construction and uses of the new Plessey food contamination monitor, which has been designed to Ministry specifications.

This is a portable equipment used for the detection and assessment of radioactive contamination of liquid or solid foods that may be due to radio-active 'fall-out'. Although designed primarily for radiological defence, the equipment has many industrial and laboratory applications.

The equipment uses Geiger-Muller tubes as the detecting elements; two tubes of similar electrical characteristics are provided, one for liquid samples and the other an end window type. A shielding castle is provided in which either tube may be mounted. In addition, an unshielded hand probe is provided in which the end window tube is normally mounted.

## CO<sub>2</sub> Kills Worker at ICI Runcorn Plant

AT RUNCORN, on 20 June, a verdict of accidental death was recorded by a jury at the resumed inquest on Frank Lyons, aged 57, process worker, of 83 Heath Road, Runcorn, who was found collapsed in Imperial Chemical Industries Ltd., Randle Works, Runcorn, on 7 June. Wallace Peacock, 2 Sandy Lane, Weston, a plant manager at the works, said heavier-than-air carbon dioxide gas probably descended on Lyons in the pit in which he was found. A vent, he added, could not deal with an increased load of carbon dioxide.

### Chemical Works to Move

The Reddish Chemical Co. Ltd., Stockport, plan to remove their works to Cheadle Hulme where land has been bought for a modern factory. The managing director, Mr. W. J. Hipkins, states that the reason for the move is to bring all the company's production under one roof.

At the present time, three sites are in use at Reddish either for manufacturing or storing purposes. These will be united at Cheadle Hulme and still leave room for further expansion.

### Methyl Chloride Explosion

After vain attempts to bring the pressure down in a container holding methyl chloride, after it had risen above danger point, two workers left to fetch the process superintendent on the next floor at the Manchester plant of Clayton Aniline. As they were returning there was an explosion which caused damage to the structure of the building. No one was injured. Production returned to normal the following day.

## Overseas News

### AUSTRIAN OIL PLUS MONTECATINI TO FORM BASIS OF PETROCHEMICAL INDUSTRY

AUSTRIAN and Italian capital is to be used jointly to set up a petrochemical industry based on the Austrian oilfields. This was announced in Vienna last week by the managing director of the state-owned Oesterreichische Stickstoffwerke, the largest chemical concern in Austria, at Linz. This company now produces nitrates, plant protection chemicals and pharmaceuticals.

The new concern, it is learned, will be known as Danubia Petrochemie AG., and will have a capital of 100 million Austrian schillings (£1.4 million), of which 51 per cent is to be taken over by Stickstoffwerke and 49 per cent by the Italian concern, Montecatini. At some future stage, up to 20 per cent of the capital may be sold in small units to private owners as 'people's shares' in which case the participation of the larger shareholders would be reduced to 40 per cent each.

Building of the new petrochemical works is to start immediately. The necessary investment costs are estimated at 120 million to 150 million Austrian schillings (£2 million approximately) for the first stage and about 1,000 million schillings (£14 million) altogether.

Of the petrochemical products that will be produced it is understood that an annual production of 5,000 tons of polypropylene (Moplen) developed by Montecatini is envisaged. At first the raw material will be imported from Italy but later it will come from the large new oil refinery which the Austrian State Mineral Oil Administration is erecting at Schwechat, south-east of Vienna. Montecatini are to grant the necessary licences and to provide initially the technical 'know-how'.

#### New Mexican Plants

New production plant in Monterrey, owned by Sosa de Mexico SA, and built at a cost of pesos 26 million, is now in operation. It will produce carbon tetrachloride and chloroform and will increase its existing production of chlorine to 32 tons a day.

A new plant to produce sodium sulphide has just been opened by Industria Nacional Quimico Farmaceutica SA de CV, on the borders of the Federal District.

#### US Aerosol Industry Expands

According to the US Chemical Specialties Manufacturers Association 390 million non-food units were aerosol packaged in 1957 and hair sprays accounted for 24 per cent of the total. In 1956 320 million units were packaged. Output in 1957 was 22 per cent greater than in the previous year. CSMA describe the increase as 'exceptional and most satisfying'.

Hair sprays make up almost a fourth of the total. The 94.4 million units packaged represent a rise of 18.5 per cent from

79.6 million in 1956 to 94.4 million in 1957.

In second place were aerosol packs of shaving preparations, which were up 21 per cent. Room deodorants and insecticides came third (41.9 million units and 41.5 million units respectively). In 1955 insecticide aerosol productions were in first place, but last year were down by over 10 million units. However, several aerosol insecticide manufacturers are known not to have reported and it is suggested that actual production may total over 50 million. The greatest output in aerosol preparations has been noted in the pigmented and metal paint and clear plastic sprays—a 62 per cent over 1956 production. Medical and pharmaceutical, and colognes and perfumes doubled last year.

#### Cassella Report Falling Sales

Cassella Farbwerke Mainkur AG report a seven per cent decline in sales for the first quarter of 1958; the decline, compared with the corresponding period of last year, will certainly not be smaller in the second quarter, it was stated at the annual meeting. Total turnover in 1957 was DM80 million.

#### West Germany and Russia Sign Trade Agreement

Under a long-term trade agreement signed recently between West Germany and the USSR, Germany will supply Russia with plant worth DM. 20 million for the manufacture of p-xytol and dimethyl terephthalate with annual capacity for dimethyl terephthalate of 6,000 tons. Plant for the manufacture of dimethyl terephthalate fibre (annual capacity 5,000 tons staple and cord fibre) will also be supplied. Further plant as follows will also be supplied:

Factory equipment for the production of artificial fibre of nylon-type and caprolactam	DM. 11 million
Installations for the production of detergents made from petroleum processing products	3
Complete plant for the production of foam-rubber with 10,000 tons annual capacity	1 complete plant
Plants for the production of plastics	DM. 50 million

In addition Germany will supply chemical products worth a total of DM. 68 million.

Russian exports to Germany will include apatite ore, kaolin, amber, manganese dioxide, coal tar pitch, naphthalene, glycerine, benzole and other chemical products.

#### Japanese Equipment Makers Approached by USSR

According to Japanese business sources several Japanese companies have been approached by Soviet purchasing agents with a view to buying large quantities of chemical industry equipment. Reports in the Japanese press say that the USSR was interested in buying complete Japanese

plants for the production of synthetic resins and other equipment for the development of her fertiliser, tar, dyestuffs and other chemical industries.

#### Israel Chemical Production and Exports

Production of triple super phosphates has been started by the Fertiliser and Chemicals Co., at Haifa Bay. It is expected that 6,000 tons will be produced in the first year.

#### West Indies Salt Project

The West Indies consume about 10,000 tons of refined salt every year, all of which has to be imported, although ample deposits of raw salt are available. Consequently, the department of chemistry of the University College of the West Indies has built a pilot plant with a salt output of 100 lb. per hour to test a novel prototype crystalliser in an effort to produce an inexpensive plant to meet local needs.

#### Sodium Polyphosphates Import Restrictions

Under public notice 35-ITC(PN)/58 the Government of India has decided that sodium tripolyphosphate, tetra sodium pyrophosphate and other polyphosphates of sodium will not be allowed import against licences for chemicals.

#### Plastics Exhibition Planned in Düsseldorf

'Kunststoffe 59,' an international fair of the plastics industry, will be held in Düsseldorf from 17 to 25 October 1959. Provisional reservations of space covering nearly 6,500 square metres have been made by about 150 firms.

Publicity, organisation and technical management are being handled by Nord-westdeutsche Ausstellungs-Gesellschaft mbH (NOWEA), Düsseldorf.

#### Norwegian Bitumen Installation

A/S Norske Shell have opened the first bitumen import installation in Norway. Situated at Larvik, and claimed to be the most modern in the world, the installation has four storage tanks, each of 3,300 cubic metres, with six service tanks for blending penetration grades and cut-backs. The capacity of the service tanks is together over 500 cubic metres. Tanks and piping are insulated with rock or glass wool and are covered with aluminium sheets.

#### US Firm Seeks Agencies in Chemicals

Mr. Ben R. Hendrix, president of the Ben R. Hendrix Trading Co. Inc., 305 Marine Building, New Orleans, US, manufacturers' representatives, importers and exporters, is in Europe for the next few weeks and will be visiting the UK for a few days during July. He would like to hear from UK manufacturers of synthetic organic chemicals and inorganic chemicals who would be interested in discussing an agency agreement whereby Mr. Hendrix would hold consignment stocks in New Orleans.



Firms interested in this enquiry should contact the Export Services Branch, Board of Trade, Lacon House, Theobalds Road, London WC1, quoting reference ESB/13797/58.

### Merck to Collaborate in Indian Streptomycin Project

Merck and Co. of the US, are to collaborate with Hindustan Antibiotics (Pte) Ltd., Pimpri, India, in the manufacture of streptomycin. Production is expected to begin in 1960. The proposed annual output of about 45,000 kg. will satisfy India's requirements it is reported and will save the country about \$3 million annually.

### Caustic Soda and Sulphuric Acid in Italy

The permanent delegate of *Aschimici* at OEEC has compiled figures for the production of caustic soda (100 per cent) and sulphuric acid (100 per cent) in Italy from 1953 to 1957.

While in 1953, 205,506 tons of caustic soda were manufactured, production became 266,019 tons in 1955 and 282,235 tons in 1957, an increase of approximately 37.5 per cent. The figures for sulphuric acid were in 1953 1,580,000 tons, in 1955 1,954,000 tons, and in 1957 2,055,000 tons: an increase of some 30 per cent.

### Taylor Instruments Open West Germany Branch

A further expansion of the Taylor Instrument Companies, whose main office is in Rochester, NY, US, has been opened under the name of Taylor Instrument GmbH, at Bockenheimer Anlage 38, Frankfurt-am-Main. This new associate company also ties up with Taylor Controls Ltd., London, Taylor Instrument Companies of Canada, and Taylor Instrument Companies of Australia. The new office has been started with the main object of facilitating sales, after sales service, and instrument maintenance. It is envisaged that actual manufacture of Taylor instruments will be carried out in West Germany at a later date.

### Oxidative Degradation of Polyethylene

Degradation of polyethylene has been under investigation at Delaware University, US, by H. C. Beachell and Nemphos SP. The degradation was studied in molecular oxygen between 150°C–250°C, in ozone-enriched oxygen between 20°C and 109°C and in fuming nitric acid between 25°C and 83°C.

The solid, liquid and vapour products have been analysed by means of their infra-red spectra. The kinetics of the oxidation were determined by measurements of oxygen absorption at both constant pressure and constant volume and by the spectroscopic increase in carbonyl band absorption. The Elovich equation for chemisorption was applied successfully to the kinetic data. The investigators state that the reaction appears to be a typical free radical reaction with a hydroperoxide intermediate.

Oxidation with ozone is reported to be comparable to that with oxygen; ozone affects only the initiation reaction. The oxidation with nitric acid, which has an activation energy of 35.6 kcal/mole, proceeds by a different mechanism.

The full 24-page report is obtainable from DSIR Lending Library Unit, reference PB 121682.

### New Canadian Sulphur Project Started

An \$8,000,000 sulphur plant extraction project being built jointly by Devon-Palmer Oils Ltd. and Texas Gulf Sulphur Co. Inc., 25 miles southeast of Calgary has been officially started.

### Australian Pesticides Market Reviewed

A report on the market for pesticides in Australia has been issued by the Export Services Branch, Special Register Information Service, Lacon House, Theobalds Road, London WC1.

Prepared by the UK Trade Commissioner Service in Australia, the report

concerns fumigants, fungicides, insecticides, rodenticides and herbicides advocated for use on stock, plants and produce of the soil and for domestic protection.

### Electric Reduction to Double Research Facilities

The Electric Reduction Co. of Canada Ltd. is to double its chemical research facilities by February, 1959. The research department is to be established in Toronto and will carry out studies relating to pulp and paper, uranium extraction, mining and metallurgy, paint, petroleum, plastics, and other products.

### Italian Plastics Institute Formed in Milan

The Istituto Italiano del Plastico, Galleria Passarella 1, Milan, has been formed to promote the use of plastics materials, research in synthetic resins, exchange of information and congresses.

A special mark which certifies that the material bearing it conforms to the specifications of UNI (Italian Standardisation Board) will be issued by the institute.

## Staatsmijnen Polyethylene Plant Nears Completion—LP Project In Pilot Stage

EXTENSIONS to various chemical plants of the Dutch Staatsmijnen in Limburg came into operation in 1957, leading to a substantial increase in sales of fertilisers and other chemicals which last year amounted to Fl 204 million (£20.4 million approximately). It is stated in the annual report that total turnover of Fl 630 million (£63 million approximately) showed a rise of 9 per cent.

Production of nitrogen fertilisers was up by 25 per cent to a level of about 200,000 tons of nitrogen, equivalent to about 900,000 tons of fertilisers. The expansion programme also comprised a plant for the production of urea. About 62 per cent of the nitrogen produced was sold in Holland. Home consumption rose to about 194,000 tons of nitrogen in the dressing year 1956/57.

The production of caprolactam could be raised by more than 40 per cent after completion of plant extensions. Production in 1957 was up on the previous year; the increased output was readily sold in Holland and overseas. Production of other chemicals, particularly alcohol and phthalic anhydride also increased. The report says that it was all sold at profitable prices.

The increase in nitrogen output was made possible by the expansion of the synthesis gas plant in which hydrogen needed for ammonia is produced, states the report. The expansion capacity was fully utilised. The expansion of ammonia capacity enabled production of ammonium nitrate, lime, nitrophosphate and calcium nitrate to be increased. More than half of the additional ammonia production was converted into urea, for which purpose a factory with an annual capacity of about 50,000 tons was put

into operation. It is stated that the special granular shape which adds to the storing qualities greatly contributed to the fact that the new product has met with a ready sale, particularly overseas.

Home consumption of nitrogen approaches the 200,000 ton level. According to experts the use of nitrogen in Dutch farming has now reached a peak—it is the highest in the world. A further rise is expected in connection with its use on grassland and it is in this section that the rise in usage has taken place in recent years.

Caprolactam is supplied mainly to the Algemene Kunstzijde Unie NV for the production of Enkalon and Akulon. A further expansion of the plant, the capacity of which has already been doubled, is being prepared. A pilot plant for the production of another starting material for nylon—'nylon salt'—has been operating for some time. Procedures for this plant have largely been developed by the company.

Construction of a plant for high-pressure polyethylene is making good progress and it is expected that production will start early in 1959. Ethylene is already being made at the company's own works. In addition, laboratories and pilot plants have been used for development work on the manufacture of low-pressure polyethylene. Small amounts have already been prepared.

A new installation for the distillation of tar products has been put into operation at Maurits. Benzene of very high purity is now being prepared by a process developed by the company. Output of alcohol was increased by more than 30 per cent. Production of phthalic anhydride was stepped up by more than 15 per cent.



## NEW MOBILE OXYGEN PLANTS GIVE PURITY OF 99.5 PER CENT

TO meet the need of engineering works, research establishments, etc., for an easily transportable oxygen producing plant British Oxygen Ltd., Spencer House, St. James's Place, London SW1, have now developed a standard range of fully transportable plants which can be easily operated for short or lengthy periods. They can be mounted in a vehicle or on a trailer or on skids for ease of movement. Self-contained with their own diesel engines, they can also be supplied to operate from local electric power supplies. No special skill on the part of the operator is stated to be necessary and one or two men, depending on the capacity of the plant, are capable of running it after suitable training.

The machinery is described as compact, safe in operation, easy to maintain and can be operated intermittently or continuously. The only requirements for satisfactory operation are the supply of fuel, lubricating oil, chemicals for the air driers and a little make-up cooling water.

The source of energy is a diesel engine. This is a power pack industrial unit complete with all normal accessories including air filters, external renewable oil filter, generator, storage batteries to operate the self-starter, fuel tank, lift pump and injector pump. An instrument panel is provided for the engine.

### Multi-stage Compressor

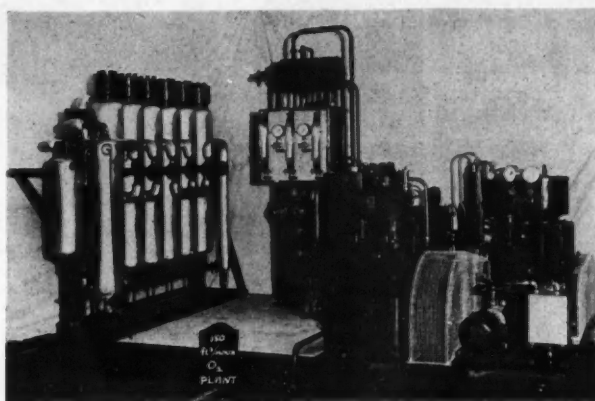
A multi-stage compressor driven by vee belting from the diesel engine is used. Air to the plant is drawn in through a dust filter and twin filters are recommended so that the equipment can operate despite quantities of dust in the atmosphere. Cooling of the air between the compression stages is performed by means of tubular intercoolers. A similar cooler is fitted after the final compression stage.

The compressed air is passed through two soda-lime purifiers to remove carbon dioxide before the air enters the separation unit, otherwise solidification of the carbon dioxide would occur at the low temperatures which prevail.

Two identical purifiers are provided. The air stream is passed in series downwards through beds of soda-lime supported in removable steel baskets in the forged steel cylindrical bodies of the purifiers. Soda-lime charges are only renewed once a week if the plant is operating continuously on normal load. This material is preferable to absorption by caustic soda for obvious reasons. The absence of a pump and valves eliminates dangerous gas leakages and reduces maintenance.

In some instances, soda-lime purification may be replaced by filtering off solid carbon dioxide to allow operation without chemicals. The air then passes into the vaporisation cooler in which cooling is effected by

One of the transportable oxygen plants introduced by British Oxygen



the saturation of waste nitrogen gas with water. Condensed moisture and oil are removed from the compressed air by passing it through a separator.

Drying out of the compressed air is completed by means of activated alumina. Two identical drier units are provided, the alumina charges alternately drying the air and being reactivated by hot waste nitrogen. The latter is a waste product of the process and is raised to the required temperature by an electric heater.

Each drier has a forged seamless steel cylindrical body, which is insulated to prevent heat and cold losses. The drier body accommodates a mild steel basket which carries the alumina charge. This is in the form of very robust pellets, which have a long working life. Reactivation of alumina is carried out *in situ*. It is a simple operation, performed by passing a stream of hot waste nitrogen through the saturated alumina in the drier. The electric heater raises the temperature of the waste nitrogen to 290°C and the heated gas is fed to the base of the drier by a flexible connection. The moisture-laden gas leaving the drier is vented to atmosphere.

The dried air is next cooled in two counter-current heat exchangers by means of the separation products of the process, travelling through the heat exchangers and thereby appreciably reducing the air temperature.

### Liquefaction

The air is then expanded through a valve, thus causing its partial liquefaction. Complete liquefaction occurs and is completed in the tubes of a reboiler in the bottom of the column. The liquid air then passes to the top of the main rectification column, where fractionation occurs and liquid oxygen collects in the sump of the reboiler. Waste nitrogen gas containing some oxygen leaves from the top of the column.

Liquid oxygen is passed through a filter and then further cooled in an undercooler. The oxygen can then be drawn off as liquid by means of a valve. If compressed oxygen is desired, the liquid is compressed in a liquid oxygen pump and is subsequently vaporised and warmed to ambient temperature in a heat exchanger. Cylinders can then be filled at any pressure up to 3,750 p.s.i.

For additional cold production the waste nitrogen stream can be expanded in a turbine, placed in the gas stream between the two major heat exchangers. Most of the gas is then fed to the vaporisation cooler and a portion of it is used for the reactivation of alumina in the driers.

When the plant is driven by a diesel engine, an 8 kw. generator set is supplied for the provision of power for the electric heater, and small motors for the turbine oil pump and fan, and the liquid oxygen pump.

A figure of 99.5 per cent purity is normally possible with all transportable oxygen plants.

### Pure Nitrogen gas

For production of pure nitrogen gas from the plant a small rectification column with superimposed condenser is required. Pure nitrogen gas is then delivered from the top of the nitrogen column and passed in series through two heat exchangers and through a pressure controller to the suction side of a suitable compressor. A gas holder is not required.

British Oxygen can provide a nitrogen compressor to compress the pure nitrogen gas up to pressures of 2,200 p.s.i. for cylinder filling. The compressed dry gas is fed through an oil separator to the cylinder filling manifold.

The above description of the oxygen producing process applies to the 1,000 c.f.h. but plants of 500 and 150 c.f.h. capacity are also available. For smaller sizes of plant the process is stated to be similar in the main but the provision of liquid oxygen with the pump, expansion turbine and nitrogen production facilities are not required. An oxygen compressor for filling industrial or aircraft cylinders is provided, however.

The trailer required to mount the 1,000 c.f.h. plant has the following dimensions: Platform: length 20 ft., width 7 ft. 6 in., height 8 ft. 6 in. approximately. When mounted on two skids, the height of the large plant is approximately 9 ft. 4 in. and the total weight is in the region of 11½ tons. The smallest size plant (150 c.f.h. capacity) can also be mounted on a skid, with a height of 8 ft. 7 in. and a total weight in the region of 5 tons. Both these equipments can be mounted on a suitable six or eight-wheeled commercial chassis.

## Commercial News

### Australian Deal for Monsanto

The US Monsanto Chemical Co., is to invest some \$2.25 million in ordinary shares of Monsanto Chemicals Australia, to finance the purchase by the Australian company of DHA (Chemicals) Proprietary and Beetle-Elliott Proprietary from Drug Houses of Australia. The majority holding in Australian Monsanto, however, is to remain with Monsanto Chemicals of London.

Sir Miles Thomas, in a letter to shareholders regarding this purchase, reports that the purchase and provision of necessary working capital are being financed by the Australian subsidiary by an issue of new ordinary shares and by borrowings in Australia. Because of Monsanto Chemicals Ltd.'s existing financial commitments in connection with its UK development programme, it has been arranged that the whole of the new ordinary shares will be subscribed by the parent company in the US at 40s (Australian) per share.

Prior to this transaction UK Monsanto Chemicals owned 79.7 per cent of the issued ordinary share capital of the Australian subsidiary. With the subscription of the new shares by Monsanto Chemical Co., US, the enlarged share capital of the Australian subsidiary is now £A.1,900,000 held as follows: Monsanto Chemicals Ltd., 58.8 per cent; Monsanto Chemical Co. and subsidiary, 37.7 per cent; and Australian interests, 3.5 per cent.

### Hardman and Holden

Trading profit of Hardman and Holden for the year ended 31 March was £270,237 (£289,120). Net profit, after tax of £85,022 (£89,348) and depreciation of £56,459 (£51,421), was £101,892 (£122,769). Final dividend of 12½ per cent is declared, making 17½ per cent (same).

### Fisons Ltd

An interim dividend of 5 per cent (same) is announced by Fisons Ltd. The total dividend paid last year was 15 per cent.

### Wm. Butler (Bristol)

Two factors have affected the 1957 accounts of William Butler and Co. (Bristol) Ltd., said the chairman, Dr. T. Howard Butler, at the annual general meeting held on 19 July. They are the revision of the tar purchase contract entered into by Butler's tar distilling subsidiary, Bristol and West Tar Distillers Ltd., and the Suez crisis.

Profit figures were given in *CHEMICAL AGE*, 7 June, p. 1038.

### British Drug Houses Ltd.

Consolidated sales of British Drug Houses and overseas subsidiaries during 1957 increased by about 6½ per cent to reach the record of £6,250,000. A major contributor to the increase, said Mr. Geoffrey C. R. Eley, chairman, in his annual statement, was the laboratory chemicals division which continued to expand.

- US Monsanto's Australian Investment
- Record BDH Home and Overseas Sales
- Merger Strengthens Courtaulds' Prospects
- Laporte Double Spending on Fixed Assets

BDH were certain that the continued spending of substantial sums on research was essential for the future of the company. During the past year, extended clinical investigations began on the new product 'Neurosteron', which from preliminary results seemed likely to prove of value in the treatment of a range of mental and emotional disorders.

Consolidated profit was £474,718 (£432,283). Taxation took £274,758 (£236,978), a disproportionate rise due mainly to the increase in Indian taxation. The net balance of £199,960 was only slightly higher than in 1956. Ordinary dividend is to be maintained at 17½ per cent.

### Boots Pure Drug Co.

Referring to the company's wholesale turnover, Mr. J. P. Savage, chairman of Boots Pure Drug Co., in his annual statement, said that an important part consisted of special contracts for the Government and companies which had no production facilities of their own. As Government policies changed and as companies erected their own plants in this country, turnover fluctuated and new markets had to be sought. The considerable increase in sales of Boots fine chemicals and medical specialities had largely offset any reduction in turnover the company may have suffered in these respects.

### Courtaulds Ltd.

At the end of Courtaulds' financial year to 31 March 1958, the expected benefits of the merger with British Celanese were already being felt, indicates the company's annual report. However, no reversal of the recent trend of falling profitability of British Celanese operations has been noted. No dividend has been declared on its ordinary stock, and the dividend on the new Courtaulds' ordinary given in exchange is being paid out of Courtaulds' profits alone.

Despite this, it is stated that the merger has in fact strengthened the prospects that the earnings cover in future for the stock can be improved.

Sales of viscous and acetate textile yarns have suffered a most severe trade recession. Development of new and modified continuous filament yarns is proceeding, aimed at widening the range of end uses.

The market for Courtelles, Courtaulds' new acrylic fibre is developing steadily. The new factory at Grimsby with a capacity of 10 million lb. annually will be brought into operation in 1959.

Activities in the plastics industry have continued to expand. Production capacity for Courlene X3, high tenacity polyethylene monofilament yarn, is now being increased. The product is of use for filter

fabrics for the chemical industry. Demand from detergent manufacturers and other industries for Courlose has been well maintained. Increasing quantities of diketene, vinyl acetate and acetyl acetone for use as intermediates to the chemical industry are being supplied.

The parent's balance-sheet shows, compared with 1956-57, a substantial reduction in the rate of capital expenditure. Year-end commitments were approximately £4.7 million (£5.05 million) for the group and £2.5 million (£2.85 million) for Courtaulds. The company also had commitments for provision of further finance to its subsidiaries of up to £2.55 million (£2.75 million).

### British Celanese

Consolidated trading balance for British Celanese Ltd. (controlled by Courtaulds Ltd.) for the year ended 31 March, 1958, was £1,671,562 (£2,526,429) plus dividends and interest £149,671 (£170,652) making £1,821,233 (£2,697,081). After depreciation £1,042,479 (£964,000), debenture and mortgage interest £114,550 (£117,348) and tax £293,575 (£965,072), the net profit was £370,689 (£650,661). The parent's net profit was £370,724 (£651,233).

### Laporte Industries

A record £3,557,200 was spent by Laporte Industries group on fixed assets in the year to 31 March, the major part being in connection with new projects. Outlay in the previous year was £1,690,601. Outstanding expenditure authorised was £1,778,000 with actual commitments of £1,090,000. No further major new plant projects are contemplated at present.

The recent rights issue brought in £1,655,354, and there is a reasonable prospect of meeting foreseeable expenditure over the next 12 months with possibly some small-scale temporary borrowings.

Group net profit, after tax, rose to £1,047,713 (£909,177) and a 100 per cent capitalisation proposal has received CIC consent.

### Yorkshire Dyeware

Ordinary distribution is being maintained by the Yorkshire Dyeware and Chemical Co. at 20 per cent for the year to 31 March 1958, with a final of 10 per cent, plus a bonus of 5 per cent as before. Group profit is £133,489 (£123,558) after tax of £174,636 (£147,582). Profit attributable to the holding company is £131,303 (£121,798).

### INCREASE OF CAPITAL

ARMOUR CHEMICALS INDUSTRIES LTD., 22 Long Lane, London EC1. Increased by £64,500 beyond the registered capital of £500.

● Laporte Industries Ltd. announce that Mr. J. L. HARVEY, M.B.E., D.L., has been elected chairman of their subsidiary, The Fullers' Earth Union Ltd., in place of Mr. L. P. O'BRIEN, who has retired from the board of that company. Mr. O'Brien remains chairman of Laporte Industries Ltd., of which company Mr. Harvey is also a director.

● DR. JOHN HAWTHORN, F.R.I.C., has been appointed to the Chair of Food Science at the Royal College of Science and Technology, Glasgow. He has been principal lecturer in this subject for the past two years. The food science section is at present attached to the Department of Pharmacy but from next session it will be an independent department under Dr. Hawthorn.

● MR. A. J. HOLDEN, B.Sc., F.R.I.C., manager of the Association of British Chemical Manufacturers, has been appointed general secretary. The post of manager, created during the war, no longer exists.

● DR. K. W. ZIMMERMANN, principal research officer of the CSIRO division of industrial chemistry, Australia, is to study recent developments in micro-analysis in the UK. Mr. J. K. TAYLOR, chief of the CSIRO division of soils is visiting the UK to study organisation of soil research.

● MR. M. E. O'K. TROWBRIDGE has been appointed managing director of Sharples Centrifuges Ltd. and Mr. J. J. SERRELL



Mr. Trowbridge

has been appointed to the board. Mr. Trowbridge is a graduate in chemical engineering of Imperial College, London, and in 1946 was awarded the Hinchley Medal for Chemical Engineering. For some years he was a technical officer with Imperial Chemical Industries Ltd., Billingham division.

Subsequently he joined Head Wrightson Processes Ltd. In 1953 he joined Sharples and was appointed technical and sales director. Mr. Serrell graduated from Cornell University, US, and did post-graduate work at Pennsylvania University. He has been with Sharples for over 20 years and is vice-president of the Sharples Corporation, with responsibility for all overseas operations.

● MR. I. FELS, B.A.(Cantab.), has been appointed a lecturer in fuel technology and chemical engineering at Sheffield University.

● In future the research department of ICI Billingham Division will consist of three groups—works, project and exploratory, and three divisions—analytical, fundamental and physics. DR. J. B. HARDING

## People in the NEWS

has been appointed research works group manager. MR. G. CHILDS, former research works manager, has been appointed to the new post of research administration manager. DR. J. G. M. BREMNER is appointed manager of the project group, and DR. A. J. HARDING has become manager of the exploratory group. Two of the division managers have been appointed. They are: MR. H. N. WILSON, analytical, and DR. N. LEVY, fundamental research. Among new research specialists appointed is MR. R. G. FRANKLIN, chemistry.

● DR. D. C. MUNRO, M.A., D.Phil.(Oxon.), has been appointed a lecturer in the department of inorganic and structural chemistry at Leeds University, from a date to be arranged.

● DR. W. E. RIPPER, former vice-chairman and scientific adviser of Fisons Pest Control, has been appointed managing director of Dow Agrochemicals.

● PROFESSOR W. T. ASTBURY, professor of bimolecular structure and honorary reader in textile physics at the University of Leeds, has been invited to attend the annual meeting of Nobel Prize winners, to be held in Lindau from 30 June to 4 July, and to lecture at several German universities during the preceding week. MR. O. H. J. DICK, secretary of the University Appointments Board, has been invited to visit the Bahrain Petroleum Co. for a short period at the end of this year, and he has been granted the necessary leave of absence to enable him to accept the invitation.

● MR. T. H. WILLIAMS, director of Australian Fertilizers Ltd., arrived in London last week on board the *Arcadia*.

● Among chemical industry personalities to gain awards in the Queen's Birthday Honours (see CHEMICAL AGE, 14 June, p. 1092) was MR. GRANVILLE D. HEWITT, a member of the directorate staff of ICI Billingham Division. A JP and a former vice-chairman of Stockton Conservative Association, Mr. Hewitt gained the M.B.E.

● DR. W. G. DAVIS, at present economic intelligence department manager at Billing-

ham, has been appointed techno-commercial manager of the new ICI Heavy Organic Chemicals Division. New appointments in the division research department are: MR. E. W. SAWYER, physical group manager; MR. D. HARVEY, analytical section manager; MR. W. HUTCHINSON, section leader in the analytical section; DR. A. BROWN is the new manager of the physical chemistry section; in the exploratory and project group, DR. R. W. G. PRESTON has been appointed a section manager.

● MR. E. E. AYLING, M.Sc., and DR. D. A. LONG have been appointed senior lecturers in chemistry at the University College of Wales for the 1958-59 session.

● DR. W. H. GARRETT, president of the British Employers' Confederation, who received a knighthood in the Queen's Birthday Honours for services to industrial relations, is a director of Monsanto Chemicals Ltd. He is also vice-chairman of the Association of British Chemical Engineers.

● MR. STANLEY R. GLOVER has joined Quickfit and Quartz Ltd., Stone (Staffs), as mechanical engineer specialising in method improvement planning.

### Lincolnshire Chemical Co. to Move

THE WORKS of the Lincolnshire Chemical Co. Ltd., Scunthorpe, producers of a range of benzoates, toluides, xylenes and other coal-tar products, are to be moved from their present site adjoining Lysaght's steelworks to another site in Scunthorpe. The move is dictated by the needs of the steelworks but will allow for the plant to be modernised. The change-over is to be carried out while maintaining production and the responsibility for co-ordination has been entrusted to Cremer and Warner, consulting chemical engineers. MR. A. E. BLUNSDEN, M.I.Chem.E., general manager and director, initiated the proposals and is responsible for the company.

### New Section and Address for BIMCAM

The British Industrial Measuring and Control Apparatus Manufacturers' Association has now moved to offices at 9 Argyll Street, London W1. At the same time BIMCAM have formed a special section for dealing with the general area of interest in instrumentation and control of heating, ventilating, air conditioning and refrigeration plant.

### Obituary

MR. WILLIAM E. IRELAND, former technical director and works manager of Orr's Zinc White works of the Imperial Smelting Corporation, died at his home in Widnes recently at the age of 73 years. Mr. Ireland came to Widnes in 1913 as colour chemist with the late Mr. J. B. Orr. He became chief chemist and subsequently works manager and technical director.



# BRITISH CHEMICAL PRICES

## GENERAL CHEMICALS

**Acetic Acid.** D/d in ret. barrels (tech. acid barrels free); in glass carboys, £8; demijohns, £12 extra. 80% tech., 10 tons, £97; 80% pure, 10 tons, £103; commercial glacial, 10 tons, £106.

**Acetic Anhydride.** Ton lots d/d, £136.

**Alum.** Ground, f.o.r., about £25.

**MANCHESTER:** Ground, £25.  
**Aluminium Sulphate.** Ex-works, d/d, £15 10s to £18.

**MANCHESTER:** £16 to £18.

**Ammonia, Anhydrous.** Per lb., 1s 9d-2s 3d.

**Ammonium Chloride.** Per ton lot, in non-ret. pack, £27 to £30 2s 6d.

**Ammonium Nitrate.** D/d, 4-ton lots, £31.

**Ammonium Persulphate.** Per cwt., in 1-cwt. lots, d/d, £6 13s 6d; per ton, in min. 1-ton lots, d/d, £123 10s.

**Ammonium Phosphate.** Mono- and di-, ton lots, d/d, £106 and £97 10s.

**Antimony Sulphide.** Per lb., d/d UK in min. 1-ton lots: crimson, 4s 7d to 5s 0½d; golden, 2s 10½d to 4s 3½d.

**Arsenic.** Ex-store, £45 to £50.

**Barium Carbonate.** Precip., d/d, 4-ton lots, bag packing, £41.

**Barium Chloride.** 2-ton lots, £49.

**Barium Sulphate [Dry Blanc Fixe].** Precip. 2-ton lots, d/d, £43.

**Bleaching Powder.** Ret. casks, c.p. station, in 4-ton lots, £30 7s 6d.

**Borax.** Ton lots, in hessian sacks, c.p. Tech., anhydrous, £68; gran., £46; crystal, £48 10s; powder, £49 10s; extra fine powder, £50 10s; BP, gran., £55 10s; crystal, £57 10s; powder, £58 10s; extra fine powder, £59 10s. Most grades in 6-ply paper bag, £1 less.

**Boric Acid.** Ton lots, in hessian sacks, c.p. Tech., gran., £76 10s; crystal, £84 10s; powder, £82; extra fine powder, £84; BP gran., £89 10s; crystal, £96 10s; powder, £94; extra fine powder, £96. Most grades in 6-ply paper bag, £1 less.

**Calcium Chloride.** Ton lots, in non-ret. pack: solid and flake, about £15.

**Chlorine, Liquid.** In ret. 16-17-cwt. drums d/d in 3-drum lots, £40.

**Chromic Acid.** Less 2½%, d/d UK, in 1-ton lots, per lb., 2s 2½d.

**Chromium Sulphate, Basic.** Crystals, d/d, per lb., 8½d; per ton, £79 6s 8d.

**Citric Acid.** 1-cwt. lots, per cwt., £11 5s.

**Cobalt Oxide.** Black, per lb., d/d, bulk quantities, 13s 2d.

**Copper Carbonate.** Per lb., 2s 9d.

**Copper Sulphate.** F.o.b., less 2% in 2-cwt. bags, £70.

**Cream of Tartar.** 100%, per cwt., about £11 12s.

**Formaldehyde.** In casks, d/d, £39 10s.

**Formic Acid.** 85%, in 4-ton lots, c.p., £89.

**Glycerine.** Chem. pure, double distilled 1,260 s.g., per cwt., in 5-cwt. drums for annual purchases of over 5-ton lots and under 25 tons, £10 1s 6d. Refined pale straw industrial, 5s per cwt. less than chem. pure.

**Hydrochloric Acid.** Spot, per carboy, d/d (according to purity, strength and locality), about 12s.

**Hydrofluoric Acid.** 60%, per lb., about 1s 2d, per lb.

**Hydrogen Peroxide.** Carboys extra and ret. 27.5% wt., £128 10s; 35% wt., d/d, £158.

**Iodine.** Resublimed BP, under 1 cwt., per lb., 14s 1d; for 1-cwt. lots, per lb., 13s 2d.

**Iodoform.** Under 1 cwt., per lb., £1 2s 4d, for 1-cwt. lots, per lb., £1 1s 8d.

These prices are checked with the manufacturers, but in many cases there are variations according to quality, quantity, place of delivery, etc.

Abbreviations: d/d, delivered; c.p., carriage paid; ret., returnable; non-ret. pack., non-returnable packaging; tech., technical; comm., commercial; gran., granular.

All prices per ton unless otherwise stated

**Lactic Acid.** Pale tech., 44% by wt., per lb., 14d; dark tech., 44% by wt., per lb., 9d; chem. quality, 44% by wt., per lb., 12½d; 1-ton lots, ex-works, usual container terms.

**Lead Acetate.** White, about £154.

**Lead Nitrate.** 1-ton lots, about £135.

**Lead, Red.** Basis prices: Genuine dry red, £104 5s; orange lead, £116 5s. Ground in oil: red, £125 5s, orange, £137 5s.

**Lead, White.** Basis prices: Dry English in 5-cwt. casks, £116; Ground in oil: English, 1-cwt. lots, per cwt., 194s.

**Lime Acetate.** Brown, ton lots, d/d, £40; grey, 80-82%, ton lots, d/d, £45.

**Litharge.** In 5-ton lots, £106 5s.

**Magnesite.** Calcined, in bags, ex-works, about £21.

**Magnesium Carbonate.** Light, comm., d/d, 2-ton lots, £84 10s under 2 tons, £97.

**Magnesium Chloride.** Solid (ex-wharf), £17 10s.

**Magnesium Oxide.** Light, comm., d/d, under 1-ton lots, £245.

**Magnesium Sulphate.** Crystals, £16.

**Mercuric Chloride.** Tech. powder, per lb., for 5-cwt. lots, in 28-lb. parcels, £1 1s 9d; smaller quantities dearer.

**Mercury Sulphide, Red.** 5-cwt. lots in 28-lb. parcels, per lb., £1 10s 6d.

**Nickel Sulphate.** D/d, buyers UK, nominal, £170.

**Nitric Acid.** 80° Tw., £35.

**Oxalic Acid.** Home manufacture, min. 4-ton lots, in 5-cwt. casks, c.p., about £129.

**Phosphoric Acid.** Tech. (s.g. 1.700) ton lots, c.p., £100; BP (s.g. 1.750), ton lots, c.p., per lb. 1s 4d.

**Potash, Caustic.** Solid, 1-ton lots, £95 10s; liquid, £36 15s.

**Potassium Carbonate.** Calcined, 96/98%, 1-ton lots, ex-store, about £74 10s.

**Potassium Chloride.** Industrial, 96%, 1-ton lots, about £24.

**Potassium Dichromate.** Crystals and gran., per lb., in 5-cwt. to 1-ton lots, d/d UK, 1s 2½d.

**Potassium Iodide.** BP, under 1-cwt., per lb., 8s. 6d.; per lb. for 1-cwt. lots, 8s 3d.

**Potassium Nitrate.** 4-ton lots, in non-ret. pack, c.p., £63 10s.

**Potassium Permanganate.** BP, 1-cwt. lots, per lb., 1s 11½d; 3-cwt. lots, per lb., 1s 10½d; 5-cwt. lots, per lb., 1s 10½d; 1-ton lots, per lb., 1s 10d; 5-ton lots, per lb., 1s 9½d. Tech., 5-cwt. in 1-cwt. drums, per cwt., £9 15s 6d; 1-cwt. lots, £10 4s 6d.

**Salammoniac.** Ton lot, in non-ret. pack, £47 10s.

**Salicylic Acid.** MANCHESTER: Tech., d/d, per lb., 2s 6d., 1-ton lots.

**Soda Ash.** 58% ex-depot or d/d, London station, 1-ton lots, about £17 3s.

**Soda, Caustic.** Solid 76/77%: spot, d/d 1-ton lots, £33 16s 6d.

**Sodium Acetate.** Comm. crystals, d/d, £91.

**Sodium Bicarbonate.** Ton lot, in non-ret. pack., £16 10s.

**Sodium Bisulphite.** Powder, 60/62%, d/d 2-ton lots for home trade, £46 2s 6d.

**Sodium Carbonate Monohydrate.** Ton lot, in non-ret. pack, c.p., £57.

**Sodium Chlorate.** 1-cwt. drums, c.p. station, in 4-ton lots, about £88 10s.

**Sodium Cyanide.** 96/98%, ton lot in 1-cwt. drums, £113 5s.

**Sodium Dichromate.** Crystals, cake and powder, per lb., 1s. Net d/d UK, anhydrous, per lb., 1s 1½d. Net. del. d/d UK, 5-cwt. to 1-ton lots.

**Sodium Fluoride.** D/d, 1-ton lots and over, per cwt., £5; 1-cwt. lots, per cwt., £5 10s.

**Sodium Hyposulphite.** Pea crystals, £38; comm., 1-ton lots, c.p., £34 15s.

**Sodium Iodide.** BP, under 1 cwt., per lb., 13s; 1-cwt. lots, per lb., 12s 9d.

**Sodium Metaphosphate [Calgon].** Flaked, paper sacks, £133.

**Sodium Metasilicate.** (Spot prices) D/d UK in 1-ton lots, 1-cwt. free paper bags, £27 10s.

**Sodium Nitrate.** Chilean refined gran. over 98%, 6-ton lots, d/d c.p., £29 10s.

**Sodium Nitrite.** 4-ton lots, £32.

**Sodium Perborate.** (10% O) in 1-cwt. free kegs, cwt. lots, £145 15s.

**Sodium Percarbonate.** 12½% available oxygen, in 1-cwt. kegs, £170 15s.

**Sodium Phosphate.** D/d, ton lots: disodium, crystalline, £40 10s, anhydrous, £88; tri-sodium, crystalline, £39 10s, anhydrous, £86.

**Sodium Silicate.** (Spot prices) 75-84° Tw. Lancs and Ches., 4-ton lots, d/d station in loaned drums, £11 17s 6d; Dorset, Somerset and Devon, per ton extra, £3 17s 6d; Scotland and S. Wales, extra, £3. Elsewhere in England, not Cornwall, extra, £1 12s 6d.

**Sodium Sulphate [Desiccated Glauber's Salt].** D/d in bags, about £20.

**Sodium Sulphate [Glauber's Salt].** D/d, up to £18 10s

**Sodium Sulphate [Salt Cake].** Unground, d/d station in bulk, £10.

**MANCHESTER:** d/d station, £10 10s.

**Sodium Sulphide.** Solid, 60/62%, spot, d/d, in drums in 1-ton lots, £36 2s 6d; broken, d/d, in drums in 1-ton lots, £37 2s 6d.

**Sodium Sulphite.** Anhydrous, £71 10s; comm., d/d station in bags, £27-£28 10s.

**Sulphur.** 4 tons or more, ground, according to fineness, £20-£22.

**Sulphuric Acid.** Net, naked at works, 168° Tw. according to quality, £10 10s.-£12 2s 6d; 140° Tw., arsenic free, £8 15s.; 140° Tw., arsenious, £8 9s 6d.

**Tartaric Acid.** Per cwt.: 10 cwt. or more, £14; 1 cwt., £14 5s.

**Titanium Oxide.** Standard grade comm., rutile structure, £178; standard grade comm., anatase structure, £163.

**Zinc Oxide.** Max. for 2-ton lots, d/d, white seal, £92; green seal, £90; red seal, £87.

## SOLVENTS AND PLASTICISERS

**Acetone.** All d/d. In 5-gal. drums, £128 in 10-gal. drums, £118; in 40-45-gal. drums, under 1 ton, £93; 1-5 tons, £90; 5-10 tons, £89; 10 tons and up, £88; in 400-gal. tank wagons, £85.

**Butyl Acetate BSS.** 10-ton lots, £173.

**n-Butyl Alcohol BSS.** 10 tons, in drums, d/d, £149.

**sec-Butyl Alcohol.** All d/d. In 5-gal. drums, £168; in 10-gal. drums, £158; in 40-45 gal. drums, under 1 ton, £133; 1-5 tons, £130; 5-10 tons, £129; 10 tons and up, £128; in 400-gal. tank wagons, £125



**tert-Butyl Alcohol.** 5-gal. drums, £195 10s; 40/45-gal. drums: 1 ton, £175 10s; 1-5 tons, £174 10s; 5-10 tons, £173 10s; 10 tons and up, £172 10s.

**Diacetone Alcohol.** Small lots: 5-gal. drums, £185; 10-gal. drums, £175. 40/45-gal. drums: under 1 ton, £148; 1-5 tons, £147; 5-10 tons, £146; 10 tons and over, £145, in 400 gal. tank wagons; £142.

**Dibutyl Phthalate.** In drums, 10 tons, d/d, per ton, £220; 45-gal. drums, d/d, per lb., 2s 0½d.

**Diethyl Phthalate.** In drums, 10 tons, per ton, £187 10s; 45-gal. drums, d/d, per lb., 1s 9d.

**Dimethyl Phthalate.** In drums, 10 tons, per ton, d/d, £179, 45-gal. drums, d/d, per lb., 1s 8d.

**Dioctyl Phthalate.** In drums, 10 tons, d/d, per lb., 2s 8d; 45-gal. drums, d/d, per lb., 2s 9½d.

**Ether BSS.** 1-ton lots, drums extra, per lb., 1s 11d.

**Ethyl Acetate.** 10-ton lots, d/d, £145.

**Ethyl Alcohol [PB 66 o.p.].** Over 300,000 p. gal. 4s 0½d; d/d in tankers, 2,500-10,000 p. gal., per p. gal., 4s 2½d. D/d in 40/45-gal. drums, p.p.g. extra, 1d. Absolute alcohol (75.2 o.p.), p.p.g. extra, 5d.

**Methanol.** Pure synthetic, d/d, £43 15s.

**Methylated Spirit.** Industrial 66° o.p.: 500-gal. and up, d/d in tankers, per gal., 5s 10½d; 100-499 gal. in drums, d/d, per gal., 6s 3d-6s 5d. Pyridinised 66 o.p.: 500 gal. and up, in tankers, d/d, per gal., 6s 2d; 100-499 gal. in drums, d/d, per gal., 6s 6½d-6s 8½d.

**Methyl Ethyl Ketone.** All d/d. In 5-gal. drums, £183; in 10-gal. drums, £173; in 40/45-gal. drums, under 1 ton, £148; 1-5 tons, £145; 5-10 tons, £144; 10 tons and up, £143; in 400-gal. tank wagons, £140.

**Methyl isoButyl Carbinol.** All d/d. In 5-gal. drums, £203; in 10-gal. drums, £193; 40-45 gal. drums, less than 1 ton, £168; 1-9 tons, £165; 10 tons and over, £163; in 400-gal. tank wagons, £160.

**Methyl isoButyl Ketone.** All d/d. In 5-gal. drums, £209; in 10-gal. drums, £199; in 40/45-gal. drums, under 1 ton, £174; 1-5 tons, £171; 5-10 tons, £170; 10 tons and up, £169; in 400-gal. tank wagons, £166.

**isoPropyl Acetate.** In drums, 10 tons, d/d, £137; 45-gal. drums, d/d, £143.

**isoPropyl Alcohol.** Small lots: 5-gal. drums, £118; 10-gal. drums, £108; 40/45 gal. drums: less than 1 ton, £83; 1-9 tons, £81; 10-50 tons, £80 10s; 50 tons and up, £80.

### RUBBER CHEMICALS

**Carbon Disulphide.** According to quality, £61-£67.

**Carbon Black.** Per lb., according to packing, 8d-1s.

**Carbon Tetrachloride.** Ton lots, £83 15s.

**India-Rubber Substitutes.** White, per lb., 1s 5½d to 1s 8d; dark, d/d, per lb., 1s 1½d-1s 5d.

**Lithopone.** 30%, about £56 10s.

**Mineral Black.** £7 10s-£10.

**Sulphur Chloride.** British, about £50.

**Vegetable Lamp Black.** 2-ton lots, £64 8s.

**Vermilion.** Pale or deep, 7-lb. lots, per lb., 15s 6d.

### COAL-TAR PRODUCTS

**Benzole.** Per gal., min. 200 gal., d/d in bulk, 90's, 5s 3d; pure, 5s 7d.

**Carbolic Acid.** Crystals, min. price, d/d bulk, per lb., 1s 4d; 40/50-gal. ret. drums extra, per lb., ½d. Crude, 60's, per gal., 8s 4d.

**MANCHESTER:** Crystals, d/d, per lb., 1s 4d-1s 7d; crude, naked, at works, 8s 4d.

**Cresote.** Home trade, per gal., according to quality, f.o.r. maker's works, 1s-1s 9d. MANCHESTER: Per gal., 1s 2d-1s 8d.

**Cresylic Acid.** Pale 99/100%, per gal., 6s 6d; 99.5/100%, per gal., 6s 8d. D/d UK in bulk: Pale ADF, per imperial gallon f.o.b. UK, from 7s 8d to 9s 3d; per US gallon, c.i.f. NY, 100 to 118.5 cents freight equalised.

**Naphtha.** Solvent, 90/160°, per gal., 5s 3d; heavy, 90/190°, for bulk 1,000-gal. lots, d/d, per gal., 3s 11d. Drums extra; higher prices for smaller lots.

**Naphthalene.** Crude, 4-ton lots, in buyers' bags, nominal, according to m.p.: £19-£30; hot pressed, bulk, ex-works, £40; refined crystals, d/d min. 4-ton lots, £65-£66.

**Pitch.** Medium, soft, home trade, f.o.r. suppliers' works, £10 10s; export trade, f.o.b. suppliers' port, about £12.

**Pyridine.** 90/160, per gal., 15s.-17s 6d.

**Toluole.** Pure, per gal., 5s 3d; 90's, d/d, 2,000 gal. in bulk, per gal., 5s.

**MANCHESTER:** Pure, naked, per gal., 5s 6d.

### Chemical Stocks and Shares

#### Markets Under a 5% Bank Rate

LAST week's reduction in the Bank Rate from 5½ per cent to 5 per cent came as no surprise to the Stock Exchange. With the bus strike nearing its end jobbers had generally marked prices up and by so doing largely discounted a ½ per cent reduction. Even so, with the bus strike out of the way, investors' attention has been switched to the Middle East situation and enthusiasm has been dampened.

1958		Security	24 June	Change over last two weeks
High	Low			
17/5½	13/4½	Albright & W. 5/-	17/2½	-3d
10/9	10/3	Anchor Ch. 5/-	10/3	-3d
1/4½	1/-	Ashe Ch. 1/-	1/1½	—
20/7½	16/9	Bakelite 10/-	19/-	—
6/4½	4/6	Berk (F. W.) 5/-	5/6	—
20/4½	14/10½	Borax 5/- Dfd.	18/1½	+8½d
15/-	10/4½	Bt. Glues 4/-	14/7½	+1½d
5/10½	5/-	B. I. Plastics 2/-	5/9	—
8/7½	7/7½	Bt. Tar Products 2/6	8/7½	—
41/-	28/3	Bt. Xylonite	41/-	—
4/4½	3/6	Coalite & Ch. 2/-	4/4½	+3d
50/6	45/9	Fisons	50/6	—
10/1½	7/6	Hardman & H. 5/-	9/4½	+3d
36/3	31/-	Hickson & W. 10/-	36/-	+3d
45/6	36/4½	ICI	45/-	+9d
3/4½	2/7½	Kleemann 1/-	3/1½	—
18/-	14/-	Laporte 5/-	17/9	—
16/3	13/9	Lawes Ch. 10/-	16/3	+9d
16/1½	12/6	Monsanto 5/-	15/6	—
13/-	10/10½	Reichhold 5/-	12/6	-7½d
9/-	8/6	Yorkshire Dye 5/-	9/-	-6d

There can be little doubt that the Government is now dropping its restrictions rapidly. To cite one example, shipowners have been told that 'Government restrictions on the sources from which they may raise capital in this country have now been removed'.

The effect of a change in the financial tide is bound to be reflected in prices before very long. Consequently now is the time for the investor to select one or two first-class chemical equities with a view to their growth prospects.

From the following short list one or two companies could be chosen which should over the long term show a good capital appreciation.

	Price	Divid.	Yield
Glaxo 10/-	39/-	12½ *	3.15 *
ICI £1	45/-	12	5.15
Laporte 5/-	17/9	16	4.45
Monsanto 5/-	15/6	13½	4.30

\*Annual dividend and yield after scrip issue.

**Xylole.** According to grade, in 1,000-gal. lots, d/d London area in bulk, per gal., 6s 2d-6s 6d.

### INTERMEDIATES AND DYES

#### (Prices Nominal)

**m-Cresol** 98/100%. 10 cwt. lots d/d, per lb., 4s 9d.

**o-Cresol** 30/31°C. D/d, per lb., 1s.

**p-Cresol** 34/35°C. 10 cwt. lots d/d, per lb., 5s.

**Dichloraniline.** Per lb., 4s 6d.

**Dinitrobenzene.** 88/99°C., per lb., 2s 1d.

**Dinitrotoluene.** Drums extra. SP 15°C., per lb., 2s 1½d; SP 26°C., per lb., 1s 5d; SP 33°C., per lb., 1s 2½d; SP 66/68°C., per lb., 2s 1d.

**p-Nitraniline.** Per lb., 5s 1d.

**Nitrobenzene.** Spot, 90 gal. drums (drums extra), 1-ton lots d/d, per lb., 10d.

**Nitronaphthalene.** Per lb., 2s 5½d.

**o-Toluidine.** 8-10-cwt. drums (drums extra), per lb., 1s 11d.

**p-Toluidine.** In casks, per lb., 6s 1d.

**Dimethylaniline.** Drums extra, c.p., per lb., 3s 5d.

### Market Reports

#### EXPORT ENQUIRIES UP TO RECENT LEVELS

LONDON There has been no marked feature on the chemicals markets during the past week and the volume of home trade continues at a steady level with no easing up in contract deliveries to the chief consuming industries. However, there is still some hesitancy in placing new forward business.

Enquiries for agricultural chemicals have been on a satisfactory scale and a good interest has been maintained in materials for the plastics industry. The volume of export enquiry is keeping up to recent levels with fairly good shipments for Commonwealth destinations.

Steady conditions are reported in the coal-tar products market with prices unchanged. The supply position is fairly easy for most products.

MANCHESTER Holiday influences are beginning to have their effect on the home trade demand for heavy chemical products on the Manchester market, which has also been affected in some sections for some time by quieter conditions in several of the using trades. On the whole, however, export business in chemicals is said to be holding up reasonably well, declines in some lines being offset by heavier shipments in other directions. Most fertilisers are now a seasonally dull trade and it will probably be some time before there is a general recovery. Most of the tar products are being taken up in fair quantities.

GLASGOW The heavy chemical market in Scotland has enjoyed a very busy week. The demand for heavy and light chemicals has been exceptionally good and well maintained throughout the period, despite the upward trend in certain metal derivatives. The general opinion is that business has taken a turn for the better, and it is felt that the upward trend experienced this week is likely to be maintained.

# NEW PATENTS

By permission of the Controller, HM Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sale Branch), 25 Southampton Buildings, Chancery Lane, London WC2, price 3s 3d including postage; annual subscription £8 2s.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

## AMENDED SPECIFICATION

Copies will be on sale 23 July or as soon as possible thereafter

Granular solid substance to a flowing gas. Stamcarbon N.V. 795 329

## ACCEPTANCES

Open to public inspection 16 July

Aliphatic sulphonyloxy compounds. National Research Development Corp. 798 259  
Calcium hypochlorite compositions. Olin Mathieson Chemical Corp. 798 201  
Fuel elements for nuclear reactors. UK Atomic Energy Authority. 798 282  
High vacuum distillation apparatus. Sulzer Freres Soc. Anon. 798 072 798 221  
Manufacturing pipes and the like of armoured plastic material. Compagnie De Pont-A-Mousson. 798 045  
Irradiating polymeric materials. Du Pont de Nemours & Co., E. I. 798 340  
Preparation of terephthalic acid. Imperial Chemical Industries, Ltd. 798 342  
Regenerating hydroforming catalysts. Esso Research & Engineering Co. 798 239  
Preparation of chloroprene. Stabilisation of chloroprene. Distillers Co., Ltd. 798 205 798 347  
Production of isopropyl alcohol and diisopropyl from propylene. Usines de Melle. 798 260  
Producing drying oils. Nilsson Aktiebolag, R. 798 351  
Production of diolefins. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. 798 253  
Hydrocarbon conversion process. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. 798 254  
Removing phosphorus-containing impurities from volatile compounds. Western Electric Co., Inc. 798 073  
Preparation of carbonaceous material suitable for use in a nuclear reactor either as moderating material or in construction of a reflector. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. 798 029  
Preparation of wholly or partly deuterated hydrocarbon material. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. 798 030  
Producing cross-linked polyvinyl alcohol. General Electric Co. 798 146  
Therapeutic compositions containing reserpine and manufacture thereof. Upjohn Co. 798 074  
Derivatives of purine and manufacture thereof. Wellcome Foundation, Ltd. (Burroughs Wellcome & Co. (U.S.A.), Inc.). [Divided out of 798 165.] 798 166  
Therapeutic compositions and manufacture thereof. Upjohn Co. 798 147

Iminodibenzyl compounds and processes for their preparation. Soc. des Usines Chimiques Rhone-Poulenc. 798 053  
Production of high molecular weight polyurethane plastics. Farbenfabriken Bayer AG. 798 209  
Thermoplastic compositions of water-soluble cellulose ethers. Abbey, A. (Dow Chemical Co.). 798 168  
Preparation of p-nitrodiphenylamine. United States Rubber Co. 798 148  
Curing epoxy ethers. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. 798 174  
Molybdenum-base alloys. Climax Molybdenum Co. 798 139  
Production of polymeric polysiloxanes. Siemens-Schuckertwerke AG. [Divided out of 798 163.] 798 164  
Production of ethylene diamine. Badische Anilin- & Soda-Fabrik AG. 798 075  
Process of coating metallic articles with aluminium or aluminium alloys. Opel AG. 798 275  
Organo-siloxanes. Midland Silicones, Ltd. 798 140  
Repairing damaged places on metal containers having a corrosion-proof surface. Geigy AG., J. R. 798 151  
Smallpox vaccine and process for preparing same. Lilly & Co., E. 798 152  
Resin compositions and curing agents therefor. Tennessee Corp. 798 177  
Manufacture of polyene-dials and polyenediones. Hoffmann-la Roche & Co., AG. 798 211

Open to public inspection 30 July

Periodic sampling and testing apparatus. Thompson & Kennicott, Ltd., J. 798 817  
Liquid storage or conveying tanks. Green & Son, Ltd., E. 799 006  
Synthetic esters and lubricants. Chandley, E. F., and Steiner, H. M. E. 799 042  
Vinyl fillers and the reinforcement of elastic and plastic materials therewith. Burke, O. W. 799 043  
Polymeric adhesives. Johnson & Johnson. 798 806  
Protecting liquids in storage from deterioration by contact with air. Clark & Co., Ltd., T. & C. 798 859  
Organic salts of tetracycline and processes for preparing tetracycline hydrochloride and acid and metal salts of tetracycline. Bristol Laboratories, Ltd. 799,044  
Compositions containing N; N-alkylene-urea compounds. Farbwerke Hoechst AG. 799 045  
Adhesion of bituminous or other hydrocarbon binders to solid materials. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. 798 872  
Fused salt baths. Imperial Chemical Industries, Ltd. 798 860  
Manufacture of carbon disulphide. Food Machinery & Chemical Corp. 798 947  
Column apparatus. Gewerkschaft Eisenhütte Westfalen, and Didier-Kogag-Hinsel-Mann, Ges. 799 098  
Production of higher ketones. Esso Research & Engineering Co. 798 838  
Depositing coatings of aluminium or of aluminium base alloys on a basis metal and for the production of pulverous aluminium-base alloys. Siemens-Planawerke AG. Für Kohlefabrikate. 798 853  
Bonding together surfaces of fibre-forming polyethylene terephthalate. Imperial Chemical Industries, Ltd. 799 046  
Purifying sugar-containing liquids. Magnetit AG. 798 881  
Apparatus for the treatment of textile fibres with a liquid in closed circuit. Riba, P. S. 798 990  
Preparing hydrogen peroxide. Solvay & Cie. 799 099

Continuous sulphonation of organic liquids. Hedley & Co., Ltd., T. 799 038  
Apparatus for reactions involving gases and/or liquids. Hedley & Co., Ltd., T. 799 039  
Organopolysiloxanes. General Electric Co. 798 968  
Detergent tablets. Unilever, Ltd. 799 075  
Separating and recovering carbon dioxide from gaseous mixtures. Soc. Per Azioni Vetrocoke. 798 856  
Extraction and purification of sapogenins. Glaxo Laboratories, Ltd. 799 047  
Pigments. Associated Lead Manufacturers, Ltd., and Read, N. J. 798 969  
Tetracycline by fermentation. Lepetit Soc. Per Azioni. 799 051  
Methods of and apparatus for the steam distillation treatment of liquids. Murray Deodorisers, Ltd. 798 970  
Factor B, an antibiotic component of antibiotic E. 129. Glaxo Laboratories, Ltd. 799 053  
Manufacture of portland cement. Texaco Development Corp. 798 972  
Chloroprene copolymers. Du Pont de Nemours & Co., E. I. 799 054  
Corrosion inhibitors and lubricating compositions containing same. Standard Oil Co. 799 055  
Lubricating composition. Esso Research & Engineering Co. 799 080  
Sulphur containing compounds and process for the production thereof. Bracco, F. 799 057  
Sorting of granular material. Soc. des Anciens Etablissements Lhuillier. 798 911  
Vaporising volatile components from viscous liquids or plastic solids. Welding Engineers, Inc. 798 912  
Gas purifiers. Compagnie Francaise Blaw-Knox. 799 101  
Allylic rearrangement of chlorine substituted butenes. Distillers Co., Ltd. 798 889  
Preparation of di-(2-hydroxyethyl) terephthalate. Distillers Co., Ltd. 799 059  
Pyrophoric composition. Horizons, Inc. 798 977  
Manufacturing effect yarns from linear polycondensation products. Naamlooze Vennootschap Onderzoekingsinstituut Research Corporation. 798 909  
Preparation of hexaalkoxydisiloxanes. California Research Corp. 799 082  
Manufacturing fibre reinforced cross-linked acrylic resin. Du Pont de Nemours & Co., E. I. 799 062  
Anhydrous sterile preparations of alkali barbiturates and alkali thiobarbiturates. Farbenfabriken Bayer AG. 798 782  
Preparing 1, 3-di-substituted pyrrolidine compounds and the compounds resulting therefrom. Mead Johnson & Co. 799 030  
Method of preparing 10-(1-substituted-3-pyrrolidylmethyl) phenothiazine, and the compounds resulting from said method. Mead Johnson & Co. 799 031  
Method of preparing 1-substituted-3-pyrrolidylmethyl benzilates and the salts thereof, and the compounds resulting from said method. Mead Johnson & Co. 799 032  
N-picolinoyl-phthalic acid hydrazide. Farbenfabriken Bayer AG. 798 846  
Lubricating oil compositions. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. 799 036 799 037  
Paraffin wax compositions. Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij. 799 063  
Quinolizine derivatives and a process for the manufacture thereof. Hoffmann-la Roche & Co. AG., F. 798 847  
Manufacture of isoxazolidone compounds. Hoffmann-la Roche & Co. AG., F. 799 066  
Organosilicon derivatives. Midland Silicones, Ltd. 799 067  
Process and apparatus for separating gaseous mixtures by rectification. Union Carbide Corp. 798 921

## TRADE NOTES

### New Lead Alloy

A new lead alloy, Antatac R1 has been developed by British Lead Mills Ltd., St. James Street, London SW1, to counteract a small but increasing number of inexplicable failures in chrome tank linings. Over 200 different alloys were made up and tested; of these, the most promising were put in small pilot plants under rigorous conditions. During tests, it was found that Antatac R1 alloy was the one not attacked by chrome plating solutions. It is now available in the form of sheet for linings and pipe for heating and cooling coils, and anodes.

### CIBA Member Changes Name

The Clayton Dyestuffs Co. Ltd., Clayton, Manchester 11, have changed their name to Ciba Clayton Ltd. with effect from 1 July.

### Fisons Reduce Fertiliser Prices

Reductions in the price of their agricultural fertilisers are announced by Fisons Ltd. Triple superphosphate will be reduced by 25s a ton; single superphosphate by 10s a ton; 40 range compounds by an average of 18s per ton and 30 range compounds by an average of 13s per ton.

### ICI's New Paint Media

Imperial Chemical Industries Ltd. have developed specifically for the UK market two new alkyd resin media for use in high-quality flat and semi-gloss interior

decorative paints and finishes. Both media, which are thixotropic gels, contain the same semi-drying oil modified alkyd resin but in one case, Modulac 135W, it is dissolved in ordinary white spirit. The other, Modulac 135WO, is dissolved in odourless white spirit.

### New Sales Company

Associated Chemical Companies Ltd. announce that as from 1 July sales of products manufactured by British Chrome and Chemicals Ltd. and Brotherton and Co. Ltd. will be handled by a newly formed subsidiary company, Associated Chemical Companies (Sales) Ltd., with its registered office at Brotherton House, Westgate, Leeds 1 (P.O. Box No. 6, Telephone 29321/8).

### R. B. Pullin

R. B. Pullin and Co. are entering the heat-control field by acquiring the thermostat business of Cyril Kieft and Co. The Kieft range of thermostats is now being manufactured within the Pullin group. Sales are being handled by the parent company, R. B. Pullin and Co., at Phoenix Works, Great West Road, Brentford.

### Solvents for Spectroscopy

British Drug Houses Ltd., Laboratory Chemicals Division, Poole, Dorset, announce the availability of specially prepared and tested qualities of the follow-

ing solvents for spectroscopic use. The materials should be ordered as 'special for spectroscopy' in each instance.

Solvent	Minimum percentage transmission in a .1cm. cell		
	2,200 Å	2,500 Å	3,000 Å
Carbon tetrachloride at 2,650 Å, 25%	—	—	97
Chloroform	—	20	97
Cyclohexane	45	95	—
Diethyl ether	40	80	—
Ethanol 95%	55	95	—
Ethanol absolute	55	95	—
Ethyl acetate at 2,550 Å, 25%	—	—	91
Hexane fraction from petroleum	70	95	—
Methanol	40	90	—
iso-Propyl alcohol	40	95	—
2:2:4-Trimethyl-pentane iso-octane	60	95	—

### Changes of Address

The address of the Midlands branch sales office of Borax Consolidated Ltd., will be changed to Griffin House, 18/19 Ludgate Hill, Birmingham 3, from 30 June.

### B.I.P. New Coating Department

A coating resins development department has now been formed at BIP Chemicals Ltd. under Mr. C. H. Morris. The department will be responsible for dealing with day-to-day development matters and technical service problems on surface coating resins.

### Electro-Chemical Engineering Co.

Address of the Electro-Chemical Engineering Co. Ltd., Metal Cleaning Division, was inadvertently omitted from their advertisement in p. 1141 of last week's CHEMICAL AGE. The address is Sheerwater, Woking, Surrey (Woking 5222).

AMMONIUM BIFLUORIDE

SODIUM BIFLUORIDE

# chemicals

SODIUM FLUORIDE


COPPER CARBONATE

LEAD FLUOBORATE

TIN FLUOBORATE

LITHIUM FLUORIDE

POTASSIUM FLUOBORATE



If you are a user of Fluorides you cannot do better than contact Cruickshanks for competitive prices and speedy deliveries. Installation of up-to-date chemical plant, together with Cruickshank's own tanker delivery service cannot fail to appeal where quality of production and speed of delivery are of utmost importance. Descriptive literature available.



## R. CRUICKSHANK LIMITED

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BIRMINGHAM 1.

Chemical Works: Charles St.,  
West Bromwich. Telephone TIpston 1117





## CHILEAN IODINE

Nitrate Corporation of Chile Limited announce that they will take over the exclusive agency for the sale of Chilean Iodine from 1st July, 1958.

All enquiries should be addressed to:

### NITRATE CORPORATION OF CHILE LIMITED

Chile House, 20-24 Ropemaker Street  
London, E.C.2

## CORROSION CONTROL

For \_\_\_\_\_

Polythene, Rigid P.V.C., Perspex and Glass Laminates, Fume Hoods, Duct and Pipe Lines, Tanks and Tank Linings, Ventilators, Valves and Machined Fittings

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ALL GRADE  
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**Granular Carbon for Solvent Recovery  
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Write for samples and quotations.

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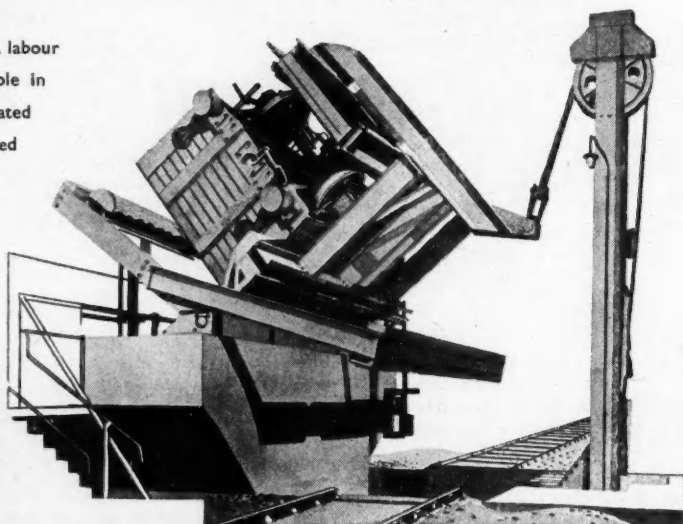
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Scofar, Wol, London

## Coal and Coke Wagon Tippers

"HENRY LEES" Wagon Tipplers save time, labour and money. Mechanically sound and simple in construction. Hand and Power Operated Wagon Tipplers for all purposes and designed to meet any particular requirement.

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### HONG KONG CHEMIST, MEDICAL DEPARTMENT

**Qualifications:** Honours degree in chemistry or equivalent professional qualification plus a minimum of three years' post-qualification experience.

**Age** not over 35 years.

**Duties:** General analytical and supervisory work.

**Terms of appointment:** On probation (two years) to the permanent and pensionable establishment with emoluments in the scale £1,245-£2,179 per annum. Cost of living allowance. Quarters provided at rental if available. Free passages. Free medical attention. Generous leave. Taxation at local rates.

Apply to Director of Recruitment, Colonial Office, London, S.W.1. State age, qualifications and experience. Quote BCD 117/51/018./F1.

## SITUATIONS VACANT

### CHEMICAL RESEARCH

The United Kingdom Atomic Energy Authority, Industrial Group, requires staff at its Experimental Reactor Establishment at Dounreay, Thurso, Caithness, Scotland to carry out chemical research using modern analytical techniques on materials which often involve radio-active substances. These techniques will include X-ray methods, spectroscopy, ion exchange, chromatography and polarography.

At least a second-class honours degree, or equivalent, in Chemistry is required. Experience in radio-active chemical research is desirable, but not essential.

Salary will be assessed within scales £1,215-£1,425 or £645-£1,120 according to age and experience. For the more senior appointments' applicants should be at least 26 years of age and have at least three years' post-graduate research experience.

Contributory Pension Scheme.

A house at Thurso or hostel accommodation may be available. Substantial assistance towards removal expenses is given in certain cases.

Send postcard for application form, quoting reference 249, to Establishments Officer, D.E.R.E., Dounreay.

Closing date: 14th July, 1958.

**QUALIFIED CHEMIST** (Degree or A.R.I.C.) required for routine control of manufacturing materials, with investigation and development work connected therewith. Experience of thermoplastics an advantage. Appropriate salary. Pension Fund. Good working conditions. Apply (in writing) to Staff Officer, B.I.C.C. Ltd., Belvedere, Kent.

**BOX NUMBERS:** Reply c/o "Chemical Age"

## SITUATIONS VACANT: continued

**UNITED COKE AND CHEMICALS COMPANY LTD.**, producers of organic chemicals from coal, require a **TECHNICAL SALES ASSISTANT**. His duties will include market research and technical liaison with research and works departments and with buyers. Practical experience in any of these fields will be an advantage. Age preferred 24/28. University degree in a scientific subject, preferably chemistry, essential. Salary by arrangement. Pension Scheme. Reply, giving full details of education, qualifications and experience, to the Commercial Manager, P.O. Box 136, Handsworth, Sheffield, 13.

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### 18/8 STAINLESS STEEL TEES & 90° BENDS

We have large stocks of most standard sizes from  $\frac{1}{4}$  in. up to 6 in. in welded and cast types; also welded and cast type mild steel reducers, tees & 90° bends, all flanged to B.S. table "E"; various types and sizes of joint packings; S.S. & M.S., nuts, bolts, flanges; S.S. welding electrodes, etc., etc., lists available, keen quotations and prompt despatch.

**WOODFIELD & TURNER LTD.**,  
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Miracle Mill with 35 H.P. A.C. S/R Motor.  
Portable Aluminium Tanks 6 ft. 6 in. x 3 ft. 6 in. x 3 ft. 6 in.  
Copper Jacketed Revolving Coating Pan 6 ft. diam.  
Hobart 80 Qt. 4-speed Electric Mixer.  
100 gall. M/S Vertical Encl. Mixing Vessel  
200 gall. Cherry Burrell Stainless Coil Vat.  
Good selection of 'Z' Blade Mixers up to 100 gallons capacity.  
At our No. 2 Depot, Willow Tree Works, Swallowfield, Berks.  
Apply: **Winkworth Machinery Ltd.**, 65 High Street, Staines, Middlesex. Telephone: 1010.

## PHONE 98 STAINES

S.S. Elec. Duplex 'Z' blade Mixer 25 in. x 24 in. x 21 in. deep.  
7½ h.p. A.C.  
S.S. Flaking Drum 4 ft. x 4 ft. 6 in. 100 w.p. A.C.  
(3) 1,800 gall. Glass lined Cyl. Enc. Tanks.  
Spiked Roll Crushers 36 in. x 6 in., 24 in. x 8 in. and 12 in. x 3 in.  
S.S. lined Autoclave 6 ft. x 3 ft. 100 w.p.  
Tanks 'U' trough and Cyl. Mixers, Pumps, Pans, Hydros, Condensers, Receivers etc.

Send for lists.

**HARRY H. GARDAM & CO. LTD.**,  
100 Church Street,  
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**COCHRAN No. 20** Vertical Steam Boiler, 100-lb. pressure, 4,800-lb. evaporation. Ditto No. 6, 900-lb. evap. Steam-Jacketed Copper Tilting Pans, 40-gallon. Kimmins, Lyndhurst Road, Worthing.

• Bouverie House . Fleet Street EC4.

## FOR SALE: continued

**MORTON, SON AND WARD LIMITED**  
offer**HYDRO EXTRACTORS:**

60in. and 48in. by **BROADBENT**, little used, complete with Igranic starters.

36in. by **BROADBENT**, belt driven. Could be motorised.

**TWO 42in.** by **WATSON LAIDLAW**, under driven through Vee ropes.

**NEW UNITS** in stainless or mild steel made to requirements.

**CONDENSERS,**

**MIXING VESSELS, JACKETED PANS** with or without mixing gear.

**'MORWARD' 'U'** shaped trough **MIXERS** with or without jackets.

**TANKS: CYLINDERS: RECEIVERS: PRESSURE VESSELS** and **AUTOCLAVES.**

**TWO 600g** open top and **TWO 400g** totally enclosed jacketed pans.

One 700g **VERTICAL DIGESTER.**

Stirring gear can be fitted to any vessels.

New portable **STIRRING UNITS** with clamp-on attachment to requirements.

New **MONO Pumps** and other second-hand pumps in stock. **AIR COMPRESSORS:** motorised, from 5 to 60 c.f.m. with or without receivers.

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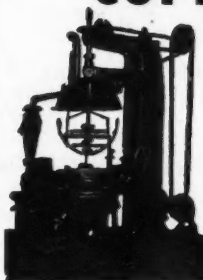
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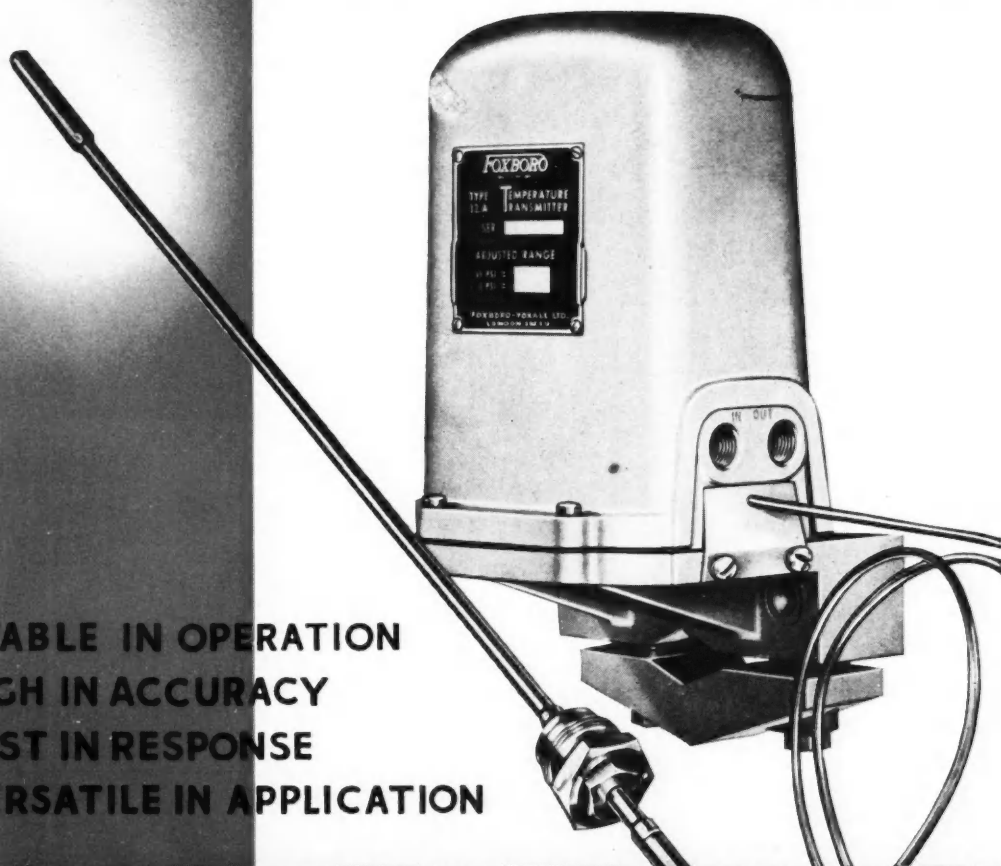
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